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Stoughton Groundwater Protection Study

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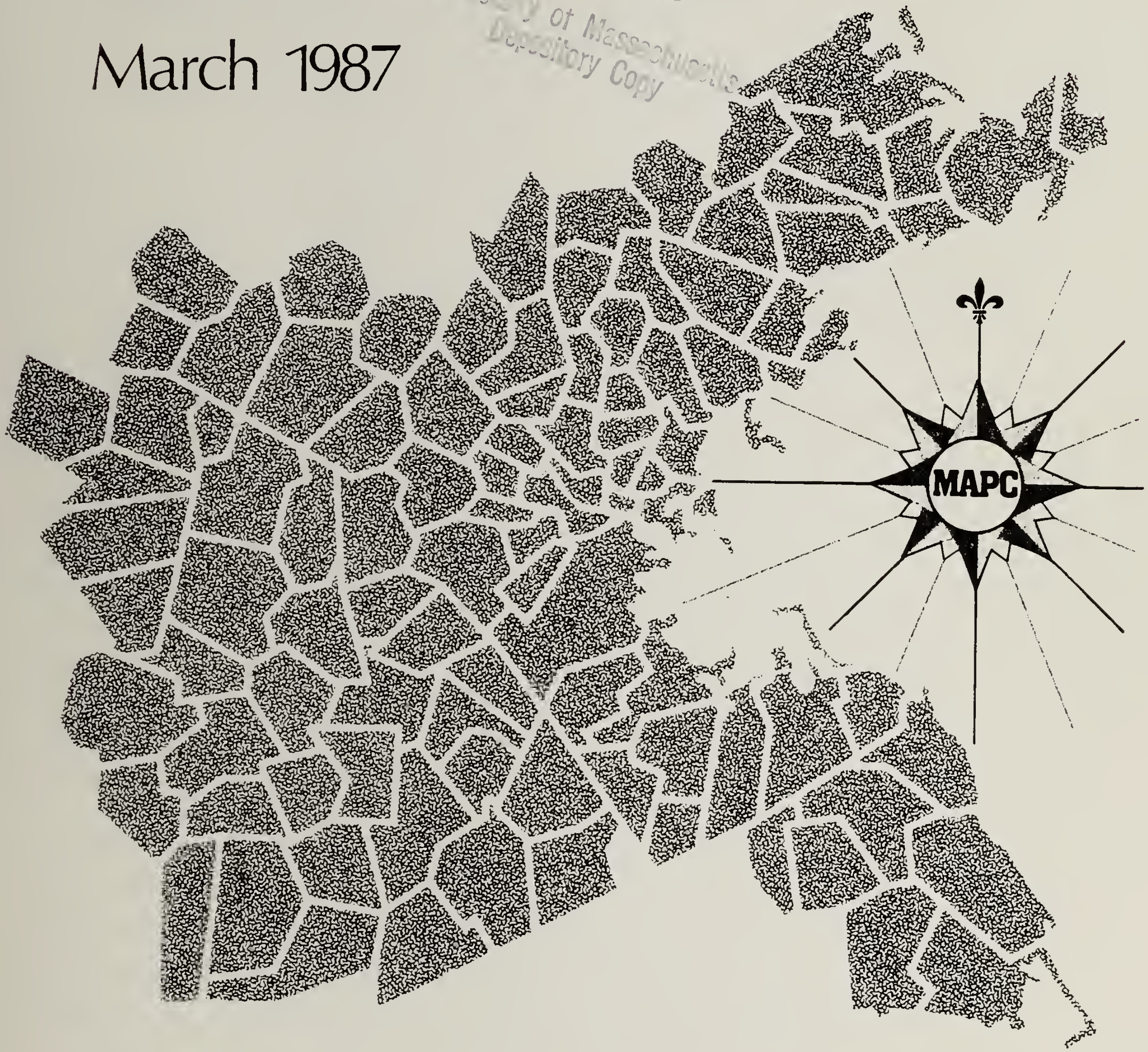

Metropolitan Area Planning Council
110 Tremont Street Boston, Massachusetts 02108

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STOUGHTON GROUNDWATER STUDY

March 1987
Metropolitan Area Planning Council
Boston, MA

ABOUT THIS REPORT

This report was prepared by the staff of the Metropolitan Area Planning Council under the supervision of the Executive Director. The Metropolitan Area Planning Council is the officially designated regional planning agency for 101 cities and towns in the Boston metropolitan area. The Council offers technical assistance to its member communities in the areas of land use, housing, environmental quality, energy, transportation, and economic development.

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Table of Contents

CHAPTER 1 BACKGROUND AND SUMMARY

CHAPTER 2 WATER SUPPLY SYSTEM PROFILE

- Water Use and Consumption
- Water Supply Sources
- Emergency Sources
- Potential Future Sources
- Water Quality
- Water Treatment
- Distribution and Storage

CHAPTER 3 WATER RESOURCES AND ENVIRONMENTALLY SENSITIVE AREAS

- Watershed Areas
- Topography and Geology
- Groundwater Resources
- Soils
- Wetlands

CHAPTER 4 LAND USE AND WATER SUPPLY IMPACTS

- Historic Development Trends
- Summary of Existing Land Use
- Land Use/Water Supply Impacts
- Potential Sources of Contamination
    - Underground Fuel Storage
    - Wastewater
    - Road Salt
    - Leachate
    - Hazardous Wastes
    - Pesticides
    - Mining

CHAPTER 5 ZONING AND REGULATION OF LAND USE

- Existing Regulations
- Zoning
- Subdivision Regulations

CHAPTER 6 FINDINGS AND RECOMMENDATIONS

- Groundwater Protection Program
    - Zoning Bylaw
    - Earth Removal Regulations
    - Underground Fuel Storage
    - Health Regulations
    - Subdivision Regulations
    - Household Hazardous Wastes

APPENDIX A Aquifer Protection District

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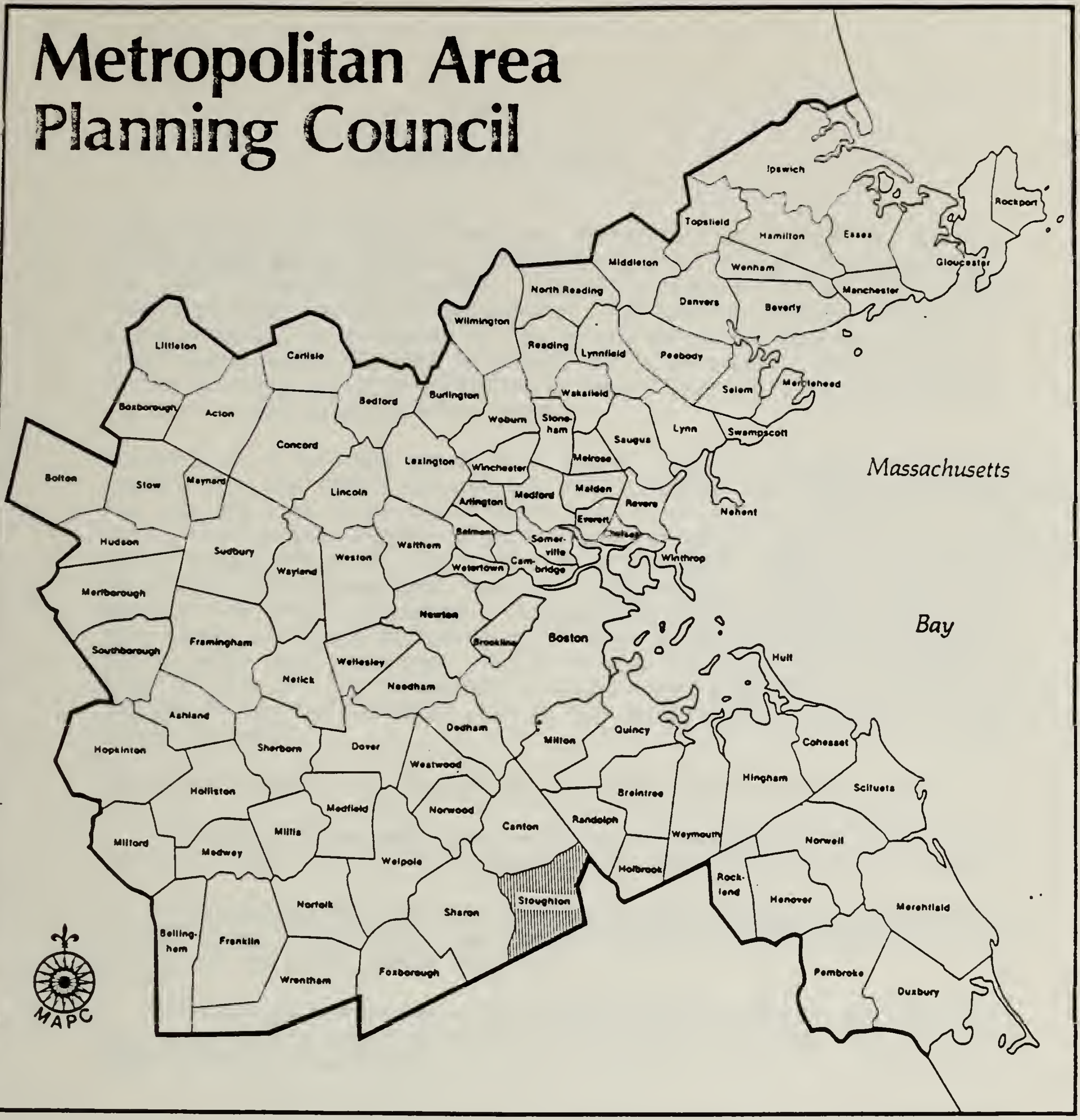
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Stoughton Groundwater

Protection Study

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CHAPTER 1

BACKGROUND AND SUMMARY

This technical assistance report was prepared at the request of the town of Stoughton, whose officials have expressed an interest in protecting the town's water supply sources. Stoughton meets all of its water supply need with local sources of groundwater. The town is already critically short of water, as evidenced by the moratorium on new hookups to the water system which has been in effect for seven years. The loss of any of the existing wells to contamination would severely affect the town's ability to meet existing water demands.

Stoughton is a suburban community of about 25,000. Although the town grew rapidly from the 1950's through the 1970's, growth has stabilized in the 1980's. The town operates seven public wells, six of which are located in a buried valley aquifer that extends along the western edge of town. This aquifer area covers about 1378 acres, or 13 percent of the town. About half of the aqufer area is currently developed, mostly in residential land uses. About one-third of the area is forested. This aquifer area is the major focus of this study, since any polluting acitivities in this area could affect the public water supply sources. There are also two other smaller aquifer areas of concern, one in southern Stoughton which contains the Goddard well, and one in the south-central part of town which may be a potential future source of water.

The overall methodology of this study included the following steps:

o inventory the water resources of the town and identify areas of particular significance to the quality and quantity of the water supply;

o inventory existing land uses and identify potential sources of contamination in the study area, and assess their potential threat to the quality of the water supply sources;

o evaluate the zoning of the undeveloped land within the study area and determine the extent to which new permitted land uses could affect the water supply in the future;

o review all existing federal, state, and local laws and regulations which control land uses and known sources of contamination; and

o recommend additional local water supply protection measures to mitigate existing and potential land use and zoning conflicts identified.

This study and its recommendations were reviewed by a town Groundwater Study Committee, which met throughout the course of the study and provided valuable information and guidance. The committee is comprised of representatives of the Board of Selectmen, the Water Department, the Town Engineer, the Planning Board, the Board of Health, the Conservation Commission, and the Zoning Board. The Town Manager assisted in organizing and facilitating the committee.

Protection of the water supply sources is vitally important in Stoughton because all drinking water comes from local sources and their are few if any practical alternative supply sources available. Other towns in the region have experienced water shortages and groundwater contamination, and the Massachusetts Water Resources Authority can only provide water on a short-term emergency basis. Stoughton's ability to remain self-sufficient in water supply, and to grow economically, will depend in part on how the town's groundwater resources are managed and protected over the long term. Stoughton has a number of policies which currently contribute to the protection of the town's water supply sources. For example:

- o the town owns several key parcels of land in proximity to its wells;
- o the zoning bylaw includes a Floodplain/Wetland/Watershed protection district;
- o the board of health regulations require twice the leaching area of state Title 5 requirements;
- o road salt is stored in a covered shed away from the aquifer, and several roads near the Harris wellfield are not salted;
- o the town bylaws require commercial underground fuel tanks to be tested every five years

This study has examined land uses, zoning, and regulations in the town and has identified areas requiring additional protection to insure the long term protection of the groundwater resources. This has led to a set of recommendations for augmenting the town's policies and regulations for protecting the water supply. The major elements of this program are:

- o a zoning amendment to create an Aquifer Protection District
- o a recommendation to conduct additional hydrogeologic studies to identify areas of contribution to wells and evaluate the potential for new source development in other aquifer areas;
- o an amendment to the earth removal regulations to require that the depth of excavation extend no deeper than ten feet above the water table, as determined by field evaluations;
- o amendments to the subdivision regulations to allow the Planning Board to require data and mitigation measures for groundwater protection;
- o an underground fuel regulation which requires registration and testing of residential underground fuel tanks, which are exempted from state regulations; and
- o collection of household hazardous wastes and public education about proper handling and disposal of hazardous materials.

Implementation and administration of the recommended program will require the cooperation and support of several town boards, as well as Town Meeting support for new or amended bylaws. An important element for sucessful implementation will be public education. The Groundwater Study Committee has a useful role to play in promoting these efforts, which may include public meetings and presentations. Increasing public awareness of the need for groundwater protection may be as important as modifying local regulations in meeting the goals of the groundwater protection program.

In the chapters that follow, the background, analysis, and the recommended groundwater protection program are described in detail. It is hoped that this study will focus attention on groundwater protection and assist the town of Stoughton in the development of a comprehensive water supply protection program.

CHAPTER 2

WATER SUPPLY SYSTEM PROFILE

Prior to examining the protection needs of Stoughton's groundwater resources it is useful to have an overview of the elements and operation of the town's water supply system. This will aid in formulating a protection plan which is responsive to the needs of the town.

WATER USE AND CONSUMPTION

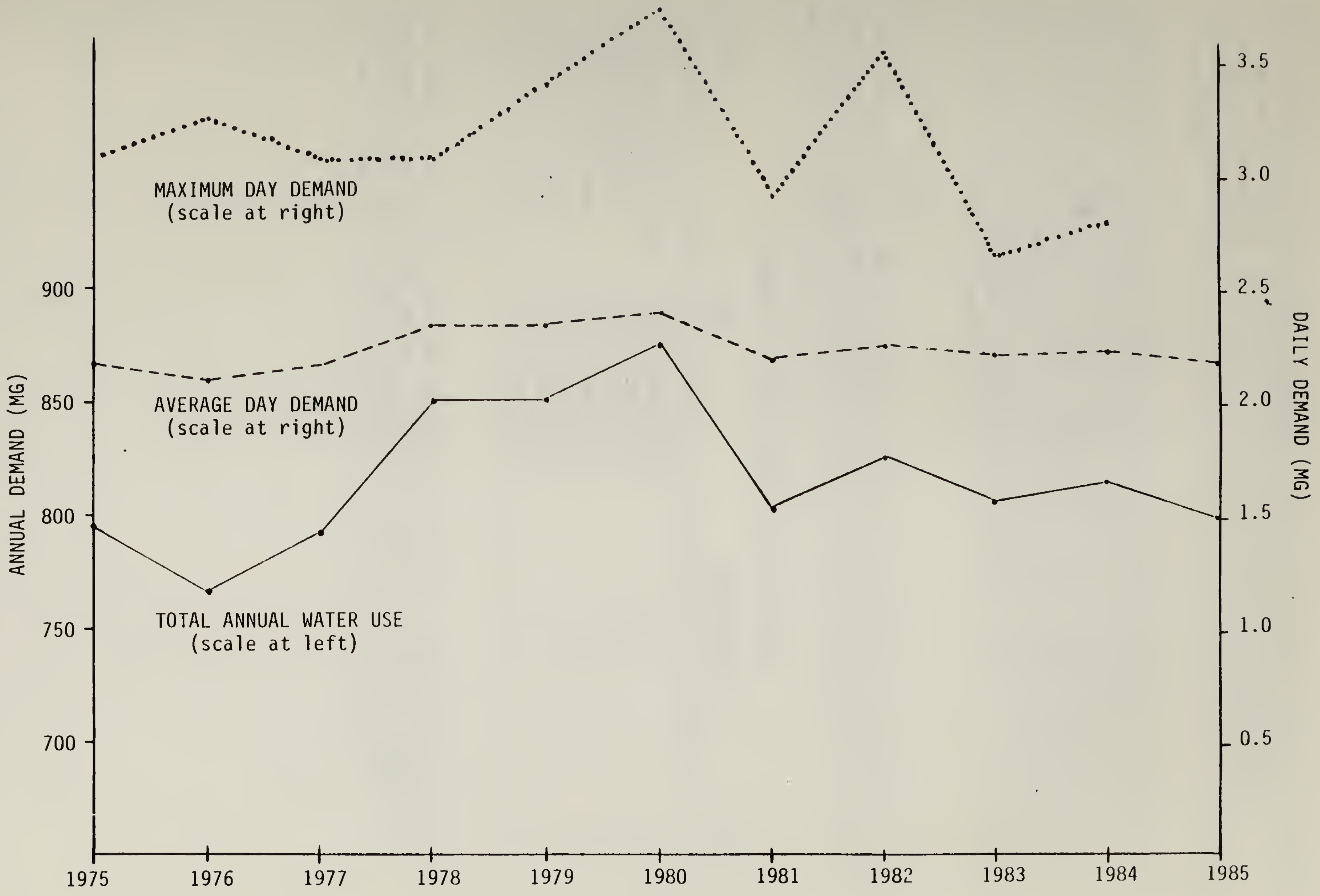
The Stoughton Department of Public Works supplies water to approximately 24,000 people, or about 96 percent of the town's population. There are approximately 7650 service connections in the system, 94 percent of which are metered. In 1985 the system delivered 800 million gallons with an average day demand of 2.19 million gallons per day (mgd), and a maximum day demand of 2.79 mgd. Water use in the town falls into the following major categories: residential (61 percent), industrial (15 percent), and unaccounted-for (24 percent).

Over the last decade, annual water use has fluctuated between 768 and 877 million gallons, stabilizing just above 800 mg for the last three years. (See table 2-1 and Figure 2-1). Average day demand has ranged between 2.1 and 2.4 mgd remaining near 2.2 for the last three years. Maximum day demand reached a peak of 3.73 in 1980, and has remained below 2.8 since 1983.

Table 2-1 Historic Water Use

Year	Water Use (million gallons)	Average Day Demand (mgd)	Maximum Day Demand (mgd)
1974	796	2.18	3.40
1975	797	2.18	3.07
1976	768	2.10	3.23
1977	792	2.17	3.07
1978	850	2.33	3.06
1979	851	2.33	3.40
1980	877	2.40	3.73
1981	804	2.20	2.91
1982	827	2.27	3.56
1983	808	2.21	2.66
1984	817	2.23	2.79
1985	800	2.19	

It is not a coincidence that water use reached a peak in 1980 and has generally declined since then. In about 1979, demand began to outstrip supply, and the town responded with a major water conservation program, including distribution of water saving fixtures and a moratorium on new connections to the water system. The resulting water savings are evident in the historic demand data in Table 2-1 and Figure 2-1. Because of the service connection moratorium which has been in effect since 1979, new development in Stoughton must rely on private wells for water supply. As a result, at least 300 new private wells have been drilled since 1979.



STOUGHTON
HISTORIC WATER USE 1975-1985

While conserving existing water resources, the town has taken steps to increase its sources of supply. These include development of two new wells and providing an emergency connection with the Massachusetts Water Resources Authority. Nevertheless, the service connection moratorium was still in effect through 1986.

Projections of future water demand made by the town's consultant in 1975 estimated that average daily demand would increase to 5.9 mgd in 1990 and 7.2 mgd in 2000. However, these projections assumed that the town would be connected to the MDC's Metropolitan Water District, allowing for virtually unlimited future water use. That connection was never implemented, and due to the shortages and conservation measures of the 1980's, water use actually declined. No new projections of future water demand have been done, but given the town's limited supplies, it seems likely that water use will not increase significantly in the foreseeable future.

WATER SUPPLY SOURCES

Local groundwater is the sole source of public water supply in Stoughton. The town operates seven supply sources with an estimated safe yield of 2.6 million gallons per day (mgd). The sources include five gravel-pack wells, one tubular wellfield, and one collecting gallery, as shown in Table 2-2.

Table 2-2 Public Water Supply Sources

Source	Type	1985 Pumping (million gallons)	Percent
Station #1-Muddy Pond	Collection Gallery	153	19
Station #2-Harris	Tubular Wellfield	227	28
Station #3-Fennel	Gravel-pack well	204	26
Station #4-McNamara	Gravel-pack well	132	17
Station #5-Gurney	Gravel-pack well	83	10
*Station #6-Pratts Ct.	Gravel-pack well	---	--
*Station #7-Godard	Gravel-pack well	---	--

*Not on line in 1985

The combined safe yield of these sources is estimated to be 2.6 mgd. This is less than the maximum day demand in each of the past 12 years. This deficit underscores the need for the conservation measures the town has adopted, as well as the need to protect all existing sources from contamination.

EMERGENCY SOURCES

Stoughton has an emergency connection to the Massachusetts Water Resources Authority (MWRA) system through a substation in Canton. Under the terms of the agreement between Stoughton and the MWRA, the town may request up to 1 mgd in emergency supplies. Under MWRA policy, such emergency connections are considered to be temporary, and may not extend for more than three years.

During the drought of the early 1980's, Stoughton had to call on its emergency supplies from the MWRA (then operated by the MDC). The amount of water purchased from the MDC during the drought was as follows:

1980	29,288,800
1981	98,357,000
1982	1,058,000
1983	1,578,000

Since then, the town has not used emergency supplies from the MWRA. The additional 1 mgd in emergency supplies, together with the 2.6 mgd safe yield of the town's supplies, gives the town a total safe yield of 3.6 mgd. However, due to MWRA policy, the town cannot rely on the MWRA on a regular basis. Except during a drought, Stoughton will need to live within its local water budget.

WATER QUALITY AND TREATMENT

The quality of Stoughton's drinking water meets all standards established under the Safe Drinking Water Act. The quality of each source is tested periodically according to state and federal requirements. Table 2-3 summarizes the water quality test results for the five sources which were operating in 1985 (see next page).

Table 2-3 Drinking Water Quality (1985)

	Harris	Fennel	McNamara	Gurney	Muddy Pond
TURBIDITY	0.2	0.3	0.2	0.3	0.3
SEDIMENT	0	0	0	0	0
COLOR	5	5	5	10	5
ODOR	0	0	0	0	0
ph	7.6	7.9	7.6	7.8	7.5
ALKALINITY-TOTAL (CaCO3)	27	67	29	39	20
HARDNESS (CaCO3)	48	71	31	42	35
CALCIUM (Ca)	12	22	8.8	14	11
MAGNESIUM (Mg)	4.3	3.8	2.3	1.8	1.8
SODIUM (Na)	16	7.1	11	7.2	12
POTASSIUM (K)	0.9	0.8	0.9	0.7	0.8
IRON (Fe)	.00	.00	.00	.00	.00
MANGANESE (Mn)	.00	.48	.00	.00	.02
SULFATE (S04)	11	2	7	7	9
CHLORIDE (Cl)	23	10	13	13	18
SPEC. COND. (micromhos/cm)	192	181	135	134	141
NITROGEN (AMMONIA)	.02	.06	.03	.02	.02
NITROGEN (NITRATE)	4.2	0.6	1 4	0.2	1.9
NITROGEN (NITRITE)	.001	.000	.001	.002	.002
COPPER	.00	.00	.57	.00	.00

The Pratts Court well is also treated for iron and manganese removal. Lime is added to all sources to adjust the pH and reduce the corrosivity of the water. It should be noted that none of these treatment technologies is capable of removing contaminants such as heavy metals and organic compounds. It is therefore necessary to prevent the introduction of these chemicals into the town's groundwater resources. This underscores the need for groundwater protection measures, which will be addressed in this study.

STORAGE

Stoughton operates four water storage facilities which have a combined capacity of 14.26 million gallons. This represents about six days' supply at average withdrawal rates. The facilities and their capacity in millions of gallons are listed below:

Ash Street	1.29
Oakland Street	.95
Pleasant Street	2.02
Forest Road	10.00
Total Storage	14.29

Because these facilities provide only short-term storage, they would be of limited value to compensate for the loss of a water source due to contamination.

POTENTIAL FUTURE SOURCES

The town's engineering consultant has investigated various parts of Stoughton in search of additional sources of water. Two new wells have recently been developed at Pratt's Court and Goddard Hospital. However, there are no other potential well sites identified at this time.

CHAPTER 3

WATER RESOURCES AND ENVIRONMENTALLY SENSITIVE AREAS

This chapter describes the characteristics of the natural environment within the town of Stoughton and their significance to the public water supplies. The areas addressed are: watershed areas, geology and topography, groundwater resources, wetlands and soils.

WATERSHED AREAS

The town of Stoughton lies within Neponset River, Taunton River, and Weymouth River basins (see Figure 3-1). A major watershed divide runs east to west through the central part of town. The northern half of Stoughton is in the Neponset River basin; the southern half of the town is within the Taunton River basin. A small section of the eastern corner of the town is in the Weymouth River basin. The town's seven public water supply sources are within the Neponset and Taunton basins. To the north, the Harris wellfield, Pratts Court well, and Muddy Pond are in the Neponset basin. To the south, the Gurney, Macnamara, Fennel, and Goddard wells are within the Taunton River basin. It should be noted that all of the wells are in the headwater areas of their respective river basins. Drainage in the Neponset basin is generally to the north, while drainage in the Taunton basin is predominantly to the south.

GEOLOGY AND TOPOGRAPHY

The landscape of Stoughton was shaped by the glaciers which covered New England until about 10,000 years ago. The topography of the town consists of low, generally rounded hills, plains, and open valleys which have been modified by glaciation.

The underlying bedrock is composed of three igneous rock units. The Salem gabro-diorite underlies the eastern half of town. This is composed of medium to coarse-grained plagioclase, pink microcline, quartz, and biotite. The Dedham granodiorite underlies central Stoughton. This formation is made up of fine to medium grained plagioclase feldspar, hornblende, and quartz. In the western portion of town, there is a granite formation called the porphyritic riebeckite granite, which is composed of a light gray granite with quartz and riebeckite in a medium grained matrix of albite.

Overlying the bedrock are various unconsolidated materials which have been deposited or altered by the glaciers. The surficial materials can be divided into two major groupings: till and sand and gravel deposits. Till is an unsorted mixture of materials of all grain sizes, from clay to sand to boulders. Most of the till in Stoughton was deposited as a ground moraine by the glaciers, or forms small oval shaped hills called drumlins. These materials are not very permeable, and therefore are not favorable aquifers. Sand and gravel deposits are generally stratified into layers of somewhat uniform grain size, making them both porous and permeable. These qualities are favorable for storage and transmission of significant quantities of

water. The sand and gravel was deposited during the period of glacial melting in the form of outwash plains, kames, kame terraces, eskers, and ice-channel fillings. In Stoughton there is a significant kame formation in the western part of town, and a large kame terrace overlying the north-central part of town.

GROUNDWATER RESOURCES

The occurrence of groundwater in the town is controlled by the surficial and bedrock geology. Aquifers which yield sufficient quantities of water for public supply wells are generally found in thick deposits of sand and gravel, which are capable of storing and transmitting significant amounts of water. The thickest areas of such permeable deposits are generally found in "buried valleys," or depressions in the bedrock which have been filled with sand and gravel deposits. Such bedrock valleys usually correspond to former (pre-glacial) stream channels.

According to the US Geological Survey's Hydrologic Atlas, there is a significant sand and gravel aquifer in the western portion of Stoughton, in a band that runs north and south along the Sharon border. Six of the town's wells are located in the vicinity of this aquifer. The atlas also identifies an area in north-cental Stoughton, and several areas in the southern part of town, one of which is the site of the Goddard well. (see Figure 3-2). It should be noted that the USGS Hydrologic Atlas is a fairly generalized regional map based on estimates of the saturated thickness and transmissivity of the surficial materials.

Weston Geophysical has conducted field studies and mapping to define the boundaries of sand and gravel aquifers in Stoughton. Based on seismic analysis and well log data, a groundwater geology map was produced which shows the thicker deposits of permeable sands and gravels (see Figure 3-1). This map corresponds fairly well to the generalized mapping of the USGS (Figure 3-2). The major aquifer in the western part of town which is shown on the Weston Geophysical map occupies about 1378 acres, or 13 percent of the land area of the town. This aquifer area is the most significant and sensitive part of Stoughton with respect to the quality of the town's drinking water. Six of the town's seven wells are in the vicinity of this aquifer. Any sources of contamination within this area may affect the town's water supply. This area will receive special attention in this study, and should be the major focus of groundwater protection measures.

SOILS

There are four major soil associations in Stoughton, and these are summarized in Table 3-1. The predominant soil association in the westren portion of town (the vicinity of the aquifer) is the Hinkley-Merrimac-Windsor association. These are well drained sandy and graely soils. which cover more than one-third of the town. These soils have only slight to moderate limitations for septic systems. The other three soil associations have greater limitations for waste disposal, due to hardpan, poor drainage, and/or shallow depth to bedrock.

TABLE 3-1

STOUGHTON SOIL CLASSIFICATIONS

(As reported by U.S. Soils Conservation Service)

Type	Characteristics	% of Town Covered	Predominant Area
Hinckley-Merrimac -Windsor Assoc.	Well drained, sandy & gravely soils. 3-25% slope. Good for wells.	37	Central & Western Sections
Millis-Woodbridge Associates	Well to moderately well-drained, 0-15% slope, hardpan w/i 2.5 ft. of surface. Okay for wells.	17	Southern Section
Muck-Whitman-Scarboro Assoc.	Very poorly drained, organic & mineral soils, 0-3% slope, tends to be swampy along streams & drainage ways.	15	
Hollis Assoc.	Shallow depth to bedrock, stoney, 3-35% slopes	13	

Source: C.E. MAGUIRE, Sewer Needs Survey, 1980

WETLANDS

Wetlands are low-lying transitional areas between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water at least seasonally. Wetlands have several unique functions and values with respect to water supplies: they filter pollutants and absorb nutrients in surface waters, provide temporary storage for flood waters, supply base flows for streams and rivers, and act as either groundwater discharge or recharge areas.

The MacConnell land use map shows 439 acres of wetlands in Stoughton, covering about four percent of the town. In the aquifer area, 95 acres, or seven percent of the aquifer, is in wetlands. Wetlands are protected by the stae Wetlands Protection Act, and by the Stoughton zoning bylaw, which includes a Floodplain/Wetlands/Watershed protection disrict.

CHAPTER 4

LAND USE AND WATER SUPPLY IMPACTS

This chapter describes the uses of land in the town of Stoughton, and examines the potential impacts of the land uses on the quality and quantity of water supply sources in the town. After a brief review of the recent growth and development trends of the town, water supply impacts will be addressed in terms of the potential sources of contamination associated with each land use.

HISTORIC DEVELOPMENT TRENDS

This section reviews several decades of growth and development in Stoughton. This perspective aids in understanding the existing land uses, as it provides information on past activities which today may affect the water supply sources.

The data on historic land use was taken from a study by William Maconnell at the University of Massachusetts, who has classified and mapped land uses by interpretation of aerial photography. The minimum parcel size mapped was three acres. Maconnell analyzed land use changes in 1951, 1971, and 1980. Table 4-1 summarizes the population and population density of Stoughton between 1950 and 1980.

Table 4-1
Population Data, 1950-1980

Year	Population	Population Density (Person/Sq. Mile	Percent Change
1950	11,146	680	-
1960	16,328	996	46.5%
1970	23,459	1,430	43.5%
1980	26,710	1,628	13.8%

The data shows that over the 30 year period population and population density has more than doubled. However, the rate of growth declined in the 1970's.

Table 4-2 shows the breakdown of land uses for 1951 and 1980. Developed land uses more than doubled from 1,843 acres to 4,290 acres, or 132 percent. The largest loss of land use was from agricultural land, which dropped by 839 acres or 69 percent.

Table 4-2
Stoughton Land Use Change, 1951-1980

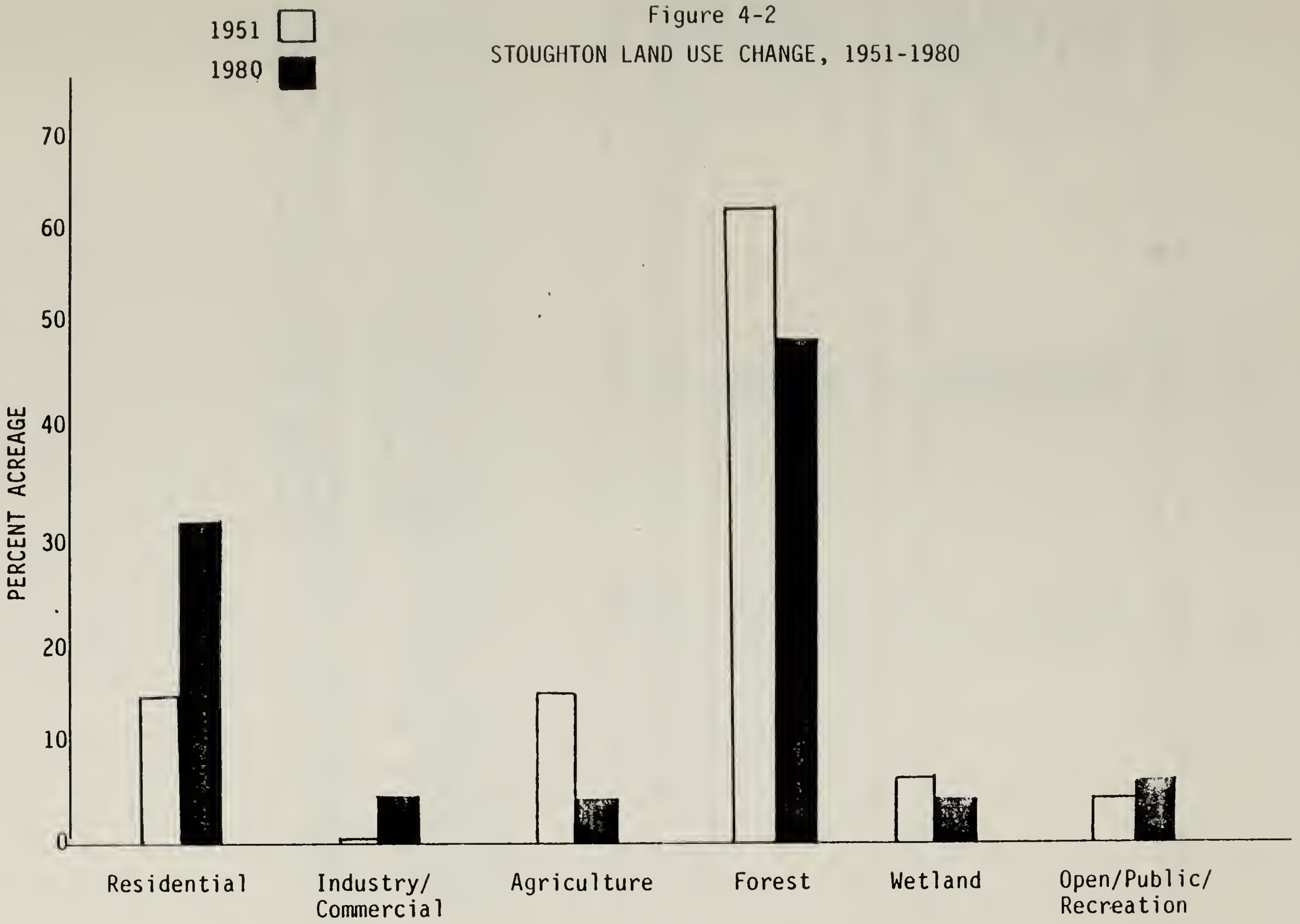
Land Use	1951 Acres	1980 Acres	Change in Acres	Percent Change
Residential	1,514	3,227	+1,713	+113
Industrial	26	210	+184	+707
Commercial	44	160	+116	+263
Open & Public	223	309	+ 86	+38
Transportation	36	139	+103	+286
Mining	*	125	*	*
Recreation	*	100	*	*
Waste Disposal	*	20	*	*
Total Developed Land	1,843	4,290	+2,447	+132
Agriculture	1,207	368	-839	-69
Forest	6,508	5,075	-1,433	-22
Wetlands	604	439	-165	-27
Open	246	200	-46	-18
Water	84	120	+36	+42
Total Undeveloped Land	8,649	6,202	-2,447	-28
Total	10,492	10,492	-	-

*Category not included in 1951 Land Use Survey

Source: MacConnell, University of Massachusetts

Figure 4-2

STOUGHTON LAND USE CHANGE, 1951-1980



SUMMARY OF EXISTING LAND USE

Table 4-3 profiles land use for the entire town of Stoughton.

Table 4-3
Stoughton Land Use, 1980

Land Use	Acres	Percent
Residential	3,227	30.7
Industrial	210	2.0
Commercial	160	1.5
Open & Public	309	2.9
Transportation	139	1.3
Recreation	100	.9
Mining	125	1.1
Waste Disposal	20	.1
Developed Land	4,290	40.8
Agriculture	368	3.5
Forest	5,075	48.3
Wetlands	439	4.1
Open	200	2.0
Water	120	1.1
Undeveloped Land	6,202	59.2
Total	10,492	100.0

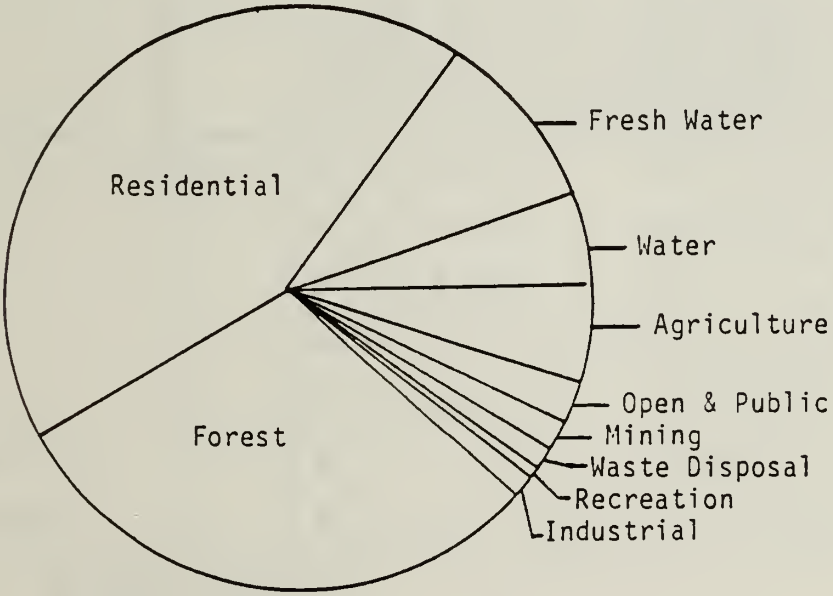
In Stoughton, 40.8 percent of land is "developed." Of this developed area, 30.7 percent is residential and 1.5 percent is commercial. The remaining area or 59.2 percent of Stoughton is considered undeveloped. This includes 48.5 percent of forest land and smaller percentages of wetland, agricultural land and open space.

The following table 4-4 focuses on one particular area of Stoughton. The land uses are outlined in this area which overlies the aquifer which is a main source of water supply to the town.

Table 4-4
STOUGHTON WATER SUPPLY AQUIFER LAND USE
1980

Land Use	Acres	Percent
Residential	545	40.0
Industrial	5	0.4
Recreation	7	0.6
Open & Public	54	3.9
Mining	42	3.0
Waste Disposal	11	0.8
Subtotal--Developed Land	664	48.7
Forest	461	33.0
Wetlands	95	6.9
Agriculture	79	5.7
Water	79	5.7
Subtotal--Undeveloped Land	716	51.3
TOTAL	1378	100.0

Figure 4-3
STOUGHTON AQUIFER LAND USE



LAND USE/WATER SUPPLY IMPACTS

Land use within the water supply aquifer can affect both water quality and water quantity through physical alteration of the environment which causes changes in drainage patterns and rates of runoff and discharge, and through discharge of contaminants to groundwater or surface water. In this chapter the potential impacts of land uses on water supplies will be analyzed in terms of the physical alterations and chemical contaminants associated with each land use. For each of the potential sources of contamination, the analysis presents:

- the characteristics and water supply impacts;
- the land uses associated with each; and
- existing conditions in Stoughton describing the prevalence of these land uses within the aquifer area.

As can be seen in Table 4-4, approximately half of the land area of the aquifer is undeveloped. This land has potential for future development. Such undeveloped land provides a natural recharge area for groundwater, and thus has little or no adverse impact on the quality or quantity of drinking water supplies. The developed land uses, which cover the other half of the aquifer area, may have the potential to cause adverse impacts on the town's groundwater resources. The relationship between these land uses and the groundwater resources is summarized in Figure 4-4 and described in the remainder of this chapter.

Figure 4-4

EFFECTS OF LAND USES ON WATER SUPPLY SOURCES

LAND USE	POTENTIAL DRINKING WATER CONTAMINANT									
	Runoff & Erosion	Abandoned Wells	Wastewater	Road Salts	Leachate	Surface Waste Impoundments	Underground Fuel Storage Tanks	Pesticides Herbicides	Fertilizers	Hazardous Wastes/Materials
Residential	○	○	●	○			○	○	●	○
Institutional	●	○	●	○			●	○	●	○
Commercial	●	○	●	○			●			●
Industrial	●	○	●	○	○	○	●			●
Agriculture	●	○	●				●	●	●	○
Transportation/Utilities	●			●			○	●		○
Waste Disposal/Mining	●				●					●

● Probable relationship
○ Possible relationship

POTENTIAL SOURCES OF CONTAMINATION

1. Underground Fuel Storage

a. Potential Impacts. Leakage of tanks or piping which are subject to corrosion or puncturing. Unprotested steel tanks have an average life expectancy of 15 years in corrosive soils. Most soil types in Massachusetts are corrosive. Once it leaks, gasoline can move through the ground and contaminate public or private wells. A small amount of fuel can contaminate much water, since concentrations of more than several parts per billion are considered unsafe.

b. Land Use Associations. Fuel storage is typically associated with service stations, fuel companies, auto dealerships, public works facilities, bus and truck fleets, schools, churches and other institutions, and residences where large underground tanks are installed for additional storage.

c. Existing Conditions

The Board of Selectmen issues licenses for the storage of gasoline and for fuel oil storage of more than 10,000 gallons. There are 175 such licensed fuel tanks in Stoughton. Of this total, 67 tanks are older than 15 years. Another 42 tanks are of unknown age because earlier records are not clear. At least 38 percent, and perhaps more than half of all tanks in the town are therefore older than 15 years, which is considered the average life of an unprotected steel tank. Only one of these tanks is in the aquifer area (at Goddard Hospital), and is in close proximity to the new well.

The Fire Department issues permits for fuel oil storage, both above ground and underground. In the western and southern portion of town, there are 134 underground fuel tanks. Of these, 76 (or 57 percent) are older than 15 years old,and an additional 20 are of unknown age. At least four of these tanks are in the aquifer area, including the tanks at the Pratts Court Well, the public school on Central Street, and the Rock Manufacturing Company on Central Street. Several others on West Street and Plain Street are in close proximity to the aquifer area.

There have been several leaking tanks discovered in Stoughton, but there are no known cases of water supply contamination as a result of fuel leakage.

Table 4-5

SUMMARY OF UNDERGROUND FUEL LICENSES (TOWNWIDE)

Age of Permit	Less Than 1,000	More Than 1,000-6,000	More Than 6,000-12,000	More Than 12,000	Total
0-5	1	4	5	5	15
5-10	0	8	5	3	16
10-15	4	19	7	5	35
15-20	7	18	3	1	29
More than 20	0	17	17	4	38
Unknown	7	25	7	3	42
Total	19	9	44	21	175

Table 4-6

SUMMARY OF UNDERGROUND FUEL OIL PERMITS (AQUIFER AREA)

	Amount of Fuel Storage (Gallons)					
Age of Permit	Less Than 500	500-999	More Than 1,000-1,999	More Than 2,000	Unknown	Total
0-5	1	3	4	8	0	16
5-10	5	2	3	3	1	14
10-15	1	1	0	5	1	8
15-20	1	4	1	2	0	8
More Than 20	32	8	11	9	8	68
Unknown	1	3	2	14	0	20
Total	41	21	21	41	10	134

Table 4-7

Stoughton Fuel Licenses

Name and Address	License Date	Gasoline & Diesel	Fuel Oil	Miscellaneous
Corcoran Shoe	?		10,000	
1 Canton Street				
Daniel Gauthier	?		1,000	
440 Canton Street				
Jet Line Service Inc.	1979	5,000		
441 Canton Street				
Joe's Service Station	1963 (at least)	3,500		
452 Canton Street				
Kelly	1964	5,000		
118 Cushing Street	1964		5,000	
Mokrisk	1971	8,000		
11 Drake Avenue				
Cohenno Inc.	1969	10,000		
92 Evans Drive	1969	5,000		
Town Hall	?		7,200	
10 Pearl Street				
Brian & Son Auto Repair	1979	30,000		
584 Pearl Street				
Atlantic Richfield Company	1963	18,000		
140 Sharon Street	1971	4,000		
	1981	2-10,000		
	1982	8,000		
Mobil Oil	1984		500	
145 Sharon Street	1984	10,000		
	1984	2-6,000		
Horan Oil Company	1979		20,000	
125 Simpson Street	1979		2-20,000	
Tosca Trust	1979	3,000		
42 Tosca Drive				
Heath Consultants	1974	1,000		
98 Tosca Drive	1979	4,000		
Louis Jones	1982		4,000	
201 Tosca Drive				
Atlantic Richfield	1963	10,000		
130 Central Street	1971	8,000		
	1984	3-12,000		
Churchill Kennith	1963		18,000	
16 Churchill Street				
Exxon Corporation	1972	3-6,000		
10 Dyhemen Way	1972			1,000
	1972		1,000	
Garber Brothers	1978	4,000		
Bay Way	1978	2,000		
Nurotoco Incorporated	1975	2-1,000		
Maple Street	1975	2-10,000		
Malthy & Company	1963	?		
30 Old Page Road				
Caldwell	1974	4,000		
156 Old Page Street	1974	4,000		
Orrin Hansen	1968	1,000		
600 Pleasant Street	1968	500		

Table 4-7 Stoughton Fuel Licenses (continued)

Name and Address	License Date	Gasoline & Diesel	Fuel Oil	Miscellaneous
TST Associates	1973	1,000		
710 Turnpike Street				
Simeone Stone Corporation	1963	4,000		
1101 Turnpike Street	1972	2-6,000		
Turnpike Texaco	1964	4-6,000		
1580 Turnpike Street	1964		1,000	
	1964			5,000
Atlantic Richfield	1963	3-4,000		
1589 Turnpike Street	1971	8,000		
Exxon Corporation	1970	17,500		
1634 Turnpike Street	1970		1,000	
	1970			1,000
Stoughton Memorial Village	?		3-2,000	
A & A Wills Company	?	2-8,000		
168 Washington Street	?	2-2,000		
	?			2-2,000
	?		1,000	
Savini, Almando & Will	1970			2-3,000
Material Corporation	1970	2-8,000		
	1970			3,000
David Chevrolet	1967	2,000		
287 Washington Street	1967		3,000	
Dino, William & Victor	1975	25,000		
318 Washington Street				
Mobil Oil Corporation	1971		1,000	
378 Washington Street	1971			500
Shell Oil Company	1963	2-8,000		
386 Washington Street	1963	10,000		
NHD Hardware	1970	?	?	?
413 Washington Street				
Phillip	1970		1,000	
471 Washington Street	1970		10,000	
Dino, William & Victor	1973	25,000		
472 Washington Street	1980	10,000		
Antons'	1967		8,320	
490 Washington Street				
Fire Line Petro	1965	2-8,000		
499 Washington Street	1965			1,120
Windsor Tire Company	1963	10,000		
500 Washington Street				
Browns' Sunoco	1979	12,000		
566 Washington Street	1979	15,000		
Joe's Gulf	1963	14,000		
591 Washington Street	1971	4,000		
Mutual Oil Company	1963	10,000		
608 Washington Street				
Johnny's Texaco	1963	4-4,000		
645 Washington Street	1963			500
	1963		1,000	
	1981	10,000		
Getty Oil Company	1981	3-8,000		
669 Washington Street				
Siani Hospital	?		1,500	
130 York Street				

7

Table 4-7 Stoughton Fuel Licensis (continued)

Name and Address	License Date	Gasoline & Diesel	Fuel Oil	Miscellaneous
Campanelli Realty Trust	1967	2-4,000		
180 Campanelli Pkwy.	1975	2,000		
Fire Line Petro	1965	2-8,000		
309 Park Street	1969	3,000		
	1969	4,000		
	1969	6,000		
Sherm Sunoco	1963	6,000		
430 Park Street	1963	12,000		
Texaco Station	?	2-4,000		
?	?	3,000		
	?	10,000		
Consolidated Freightway	1974	4,000		
1148 Park Street	1974	10,000		
Alpine Press Company	?		2,500	
Shunan Avenue	?	4,000		
Goddard Hospital	?		10,000	
909 Sumner Street				
Texaco Company	1965	11,000		
Rt. 27 & Turnpike Streets	1965	10,000		
Shaw Glass	1969	3,000		
213 Turnpike				
Mutual Oil	1963	3-10,000		
724 Washington Street				
Joe's Shell	1964	3-4,000		
825 Washington Street	1964	8,000		
Ruggiero & Son	1974	5,000		
931 Washington Street	1974	3,000		
Public Works	1981	20,000		
950 Washington Street				
P.C. Petroleum	1971	15,000		
990 Washington Street	1974	10,000		
Sure Gas Station	?	2-4,000		
990 Washington Street	?	5,000		
Unda Walter	?	2-4,000		
1139 Washington Street	?	8,000		
	?		1,000	
	?			500
Early, TF & Son	1970	2,000		
1171 Washington Street &	1971		8,000	
lot #97 Washington	1972		56,000	
Ashmont Discount	1981	4,000		
1202 Washington Street				
Danny's Auto Service	1972	12,000		
1317 Washington Street				
TK Realty Trust	1980		3,000	
1771 Washington Street	1980		1,000	
Dentch Ford	1969	4,500		
1776 Washington				

Table 4-7 Stoughton Fuel Licensis (continued)

Name and Address	License Date	Gasoline & Diesel	Fuel Oil	Miscellaneous
Cumberland Farms	?	9,000		
309 Park			2,000	
Arco	?	?		
140 Sharon				
J.F. White Contracting	?	1,000		
56 Old Page Street	?	1,000		
Roto-Rooter	?	20,000		
175 Maple Street				
Campanelli Realty Trust	?	3,000		
100 Alpine Circle				
Murphy Coal	?		65,000	
Morton Square				
E.T. Horan	?	4,000		
125 Simpson Street				
Atlantic Richfield	?	?		
130 Central				
Ken Kelley	?	3,000		
118 Cushing				
Exxon	?	?	?	?
Rt. 139 & Route 24				
Exxon	?	?	?	?
Rt. 24 & Dykeman				

Table 4-8 Stoughton Fuel Permits

Name and Address	Tank Size	Date	
Edward Martini 144 Clapp Street	275	1950	
Errol Austin 55 Corbett Road	5,000	1985	
C. Austin	550	1985	
Ronald Palesner Dean Street	1,000	1983	
Dean Park	5,000	1979	
Ronald Palesner 21 Decota Drive	1,000	1983	
James Pooler 12 Ellsworth	500	1948	
Shalah Hebrew School 50 Ethyl Way	1,000	1982	
Chales Techiera 42 Faxon Rd.	275	1959	
Walter Walent 74 Forest Rd.	?	1962	
Gucherman 50 Greg Rd.	1,000	1970	
Larry Blacker 22 Farnham Rd.	2,000	1979	
Maurice Doyle 177 Highland Street	500	1976	
G. Kronongold 261 Highland Street	300	1975	
Daniel Abrams 321 Highland Street	1,000	1970	
Steephen Motowglar 73 Kenmore Road	275	1982	
Leo Burley 53 Laarkover Terrace	275	1962	
Lithevanian National Hotel 24 Morton Street	1,000	1957	
Lithuanian Hall 35 Morton Street	1,000	1950	
Morton St. Elementary School Morton Street	10,000	1971	
Guy Celi 190 Morton Street	1,000	?	
New England Furniture Morton Square	1,500	1951	
New England Furniture 3 Morton Square	1,000	1979	
A. Donovity 11 Morton Square	1,000	?	
St. Mary's School Atherton Street	2,000	1961	Zone ?
Alpine Press 100 Alpine Circle	2,500	1980	
William M. 67 Birchwood Road	2,000	1975	

Table 4-8 Stoughton Fuel Permits (continued)

Name and Address	Tank Size	Date
Nead Rubber 25 Brock	16,400	1933
F.E. Benton Compoany 26 Brock	550	?
Corcoran Shoe 2 Canton Street	10,000	1975
Shawmut Mills 208 Canton	5,000	1929
Barry Martin (has Dodge) 327 Canton	1,000	1978
Jetline		
o 401 Canton Ave.	2,000	1976
o 1st area	3-10,000	?
o 2nd area	4-10,000	?
	3-15,000	?
o 3rd area	2-2,500	?
total	190,000	
o 441 Canton Ave.	2,000	1979
Frank Gill 457 Canton	500	1953
C. Ruggiero Service Station 458 Canton	1,000	1957
David Gill 00 Central	550	1969
Atlantic Service Station 134 Central	500	1959
Mobil Oil Central Street	550	1969
Henerutta MacLean 900 Central	1,000	1953
Ark-Les Switch 1165 Central	1,000	1965 1962?
S.W. Nasher 1208 Central	1,000	1928
Quality Steel Products 1550 Central	5,000	1963
William Hodges 1683 Central	500	1930
Town of Stoughton - P.S. 1740 Central	2,000	1976
Rock Manufacturing Company 1778 Central	500	1947
1779 Central (outside) -	10,000	1950
Bobigiam, Aram	1,000	1966
Town of Stoughton 10 Pearl	6,680	1950
Donald Demmons 17 Pearl	1,000	1947
William Sellon 30-32 Pearl	5,138	1971
Stoughton Drug 434 Pearl	2,000	?

Table 4-8 Stoughton Fuel Permits (continued)

Name and Address	Tank Size	Date
Faith Baptist Church Pearl	1,000	1961
Cities' Service Oil 584 Pearl	500	1971
Robert Bomhard 618 Pearl	2,000	1973
Dorothy Dennison 357 Plain	1,000	1957
Mr. Dennison 423 Plain	1,000	1957
Scott Lindelof 490 Plain	1,000	1984
Josephine Crawford 555 Plain	1,000	?
Nicola Pellegrino 836 Plain	2,000	1975
Stoughton PWP - Well Pratts Court	5,000 (vault)	1985
John Lombard 29 Rayburn	275	1955
Joseph Coyle 41 Rayburn	275	1955
Ralph Goulett 61 Rayburn	275	1955
	500	1984
Madden 61 Roberts	500	1984
Abram Frank 21 Robicheau Circle	275	?
Morris Singer 20 Robicheau Circle	275	1979
Robert Crean 48 Sentinel	1,000	1973
Eldon Morrill 64 Seventh	275	1951
Mobil Gas Station Sharon & Bay Rd.	500	1984
Atlantic Oil 140 Sharon	500	1962
United Machine ? South Street	2-1,000	1944
John Andrade 56 Spring	500	1979
Dan MacPhee 88 Stoughton	275	1950
Theodore Gilbert 96 Stoughton	275	?
Tom Roxborough 97 Stoughton	275	1950
C. Webber 104 Stoughton	275	1950
B. Kravitz 107 Stoughton	275	1950

Table 4-8 Stoughton Fuel Permits (continued)

Name and Address	Tank Size	Date
S. Greenfield 112 Stoughton	275	?
L. McCormick 115 Stoughton	275	?
R. Smales 120 Stoughton	275	1950
D. Dixon 123 Stoughton	275	1950
P. Banks 131 Stoughton	275	1950
R. Dempsey 139 Stoughton	275	1950
F. Carroll 145 Stoughton	275	1950
T. Keane 148 Stoughton	?	?
P. Tripp 153 Stoughton	275	1950
C. Lindsey 156 Stoughton	275	?
A. Bryan 159 Stoughton	275	1950
J. Connors 164 Stoughton	275	1950
A. Warren 167 Stoughton	275	?
W. Wilds 170 Stoughton	275	1950
C. Grant 178 Stoughton	275	1950
F. Boyle 186 Stoughton	275	1950
P. Simon 194 Stoughton	275	1950
C. Fahey 202 Stoughton	275	1950
G. O'Donnell 212 Stoughton	275	?
D. Paukner 228 Stoughton	275	?
Gerald Follman Apartments 68 Summer Avenue	5,000	1981
Lloyd Corporation 84 Summer Avenue	5,000	1969
Panther Rubber Company 104 Summer Street	5,000	1950
J. Parker 485 Sumner Street	1,000 1,000	1931 1931
J. Kelly 499 Sumner Street	1,000	1945
Goddard Hospital 909 Sumner Street	10,000	1980
D. Frederick 37 Symth	2,000	1977

Table 4-8 Stoughton Fuel Permits (continued)

Name and Address	Tank Size	Date
J & W Carpet ? 201 Tasca Drive	4,000	1982
Selby 1530 West Street	2,000	1986
Stoughton Crushed Stone 1101 Turnpike	5,000	1950
Atlantic Refining 1589 Turnpike	500	1961
E. Samson 13 Valley	275	1950
F. Campbell 41 Valley	275	?
J. Gurney 991 West	500	1937
A. Dykeman 1055 West	2,000	?
C. Libby 1144 West	2,000	1982
M. Ross 1308 West	2,000	1952
C. MacNamara 1404 West	1,000	1950
J. Turtlotte 12 Wildwood	275	1962
Pat Catalano	250	1980
R. Swan 5 Wyman	2,000	1927
Dykeman, Elec 24 Wyman	500	1949
Masonic Block 38 Wyman	1,000	1929

2. Wastewater

a. Potential Impact. Both surface water and groundwater supplies can be affected by problems associated with disposal of sanitary wastes. Failing septic systems can be caused by improper siting, installation or maintenance. Soil type, depth to bedrock and depth to the water table can be major factors in septic systems failures. Such failures can introduce excessive nutrients, chlorides, bacteria and household chemicals into soil which can then leach into water supplies. According to DEQE, septic systems on lots less than 40,000 square feet in area have the potential to contaminate groundwater.

b. Land Use Associations. Residential, commercial, and industrial land use generate wastewater. These land uses occupy about 35 percent of the town.

c. Existing Conditions.
About 45 percent of the town is served by the town's sewer system, which discharges to the MWRA system. In the aquifer area, there are sewers in parts of West Street, Elm Street, Central Street, and Lakewood Drive. Most of the remainder of the area is unsewered, relying on septic systems for wastewater disposal. The southern aquifer area around the Goddard Hospital Well is sewered.

The town has conducted detailed studies to determine the adequacy of existing wastewater disposal and the need to expand and upgrade the existing sewer system. The study was based in part on a questionnaire survey of residents in 27 parts of town. Based on survey results, the 27 areas were assigned a priority ranking for sewer upgrading. Parts of ten of the study areas fall within the aquifer areas. The ranking of these areas is as follows: (see next page)

STOUGHTON SEWER NEEDS SURVEY
Priority Ranking of Areas in the Aquifer

Area Number	Ranking*	Comments
1	21	Soil conditions generally good. Most residents satisfied with present systems.
2	19	Soil conditions generally good. Majority of residents satisfied with present system.
3	11	Very high % of garbage disposals, young area; soil conditions generally good. Majority of residents desire sewer.
4	24	Generally good soil conditions. No particular problems in this area. Majority of residents desire sewer.
5	27	Generally good soil conditions. No desire for sewer.
6	12	Generally good soil conditions. Older area; problems in the Pearl and Adams Streets Areas.
18	18	Generally good soil conditions, young area. Majority of residents desire sewer; good size lots.
19	22	Generally good soil conditions in Plain Drive Area; major problems are Poskus Street and Kweder Avenue (low lying areas).
20	10	History of septage pumping problems; potential detrimental water quality effects, remote area.
23	7	History of septage pumping problems; low lying wet areas; high percentage of garbage disposals; poor soil conditions; Ryan Road area.

* Areas ranked from 1 to 27, with 1 being area of greatest need for sewer upgrading.

The table above indicates that the aquifer area generally does not have high priority needs for sewer upgrading. The highest priority areas are in the northern and eastern portions of the town, out of the aquifer area. The town is taking steps to upgrade sewer services in these areas.

The town has a sewer master plan which was prepared in 1963 and updated in 1976 and 1980. The plan calls for extension of the sewer system throughout the town, including the aquifer areas. The town is proceeding to implement the plan in stages, with the high priority areas in the Sewer Needs Survey generally receiving attention first.

3. Road Salt

a. Potential Impacts. Deicing chemicals such as sodium chloride applied to roads in winter or stored in uncovered piles can wash off pavements into surface water bodies or percolate through soils to groundwaters. Since standard water treatment systems are unable to remove sodium from drinking water, sodium concentrations which may be harmful to the health of some individuals may result. Also, at high concentrations, sodium can corrode water distribution pipes and water fixtures. Therefore, the Massachusetts Department of Environmental Quality Engineering has set a health standard of 20 mg/l for sodium. DEQE requires regular sampling and analysis of sodium concentrations in public water supplies and notification of customers if the concentrations exceed the standard.

b. Land Use Associations. Land uses which are associated with use of road salts are transportation, for maintaining road safety in the winter, and residential, institutional, commercial and industrial, for clearing parking lots and private drives.

c. Existing Conditions. Responsibility for maintaining roads in the town is divided between the state DPW and the town DPW. The state maintains Route 138 (Washington Street), Route 27 (Park Street, Canton Street and part of Central Street) and Route 24. The state DPW applies pure salt at an application rate of 300 pounds per lane mile on its roads. In Stoughton, there are about 25 lane-miles of state-maintained roads. Each application of salt therefore results in the use of about 7,500 pounds of salt by the state DPW.

Most of these state-maintained roads are out of the aquifer area. About a one-mile segment of Route 27 (Central Street) traverses the northern edge of the main aquifer, about 1500 feet from the Pratts Court and Harris Wellfields. Within the watershed, these two wells are upgradient from Route 27.

The Stoughton DPW maintains all other roads in the town. The town uses a salt/sand mixture which has averaged 15 percent salt over the past four years. The actual mixture is adjusted to individual storm conditions. During lighter storms the DPW may treat only the main thoroughfares, while during severe storms or icing conditions, all roads will be treated.

As a protective measure, Hillwood Avenue, near the Harris Well, is treated with sand only. All salt used by the town is stored in a covered shed at the DPW yard on Central Street.

4. Leachate

a. Potential Impacts. Leachate is liquid waste which results when water percolates through buried materials in sanitary landfills waste impoundments, and other disposal sites. Depending on the characteristics of the buried materials, leachate can contain inorganic and organic contaminants, as well as dissolved solids which can degrade groundwater supplies.

b. Land Use Associations. Land uses which may be associated with leachate generation are classified as waste industrial and commercial. Waste uses include sanitary landfills and other official dump sites.

c. Existing Conditions. There are no active landfills in the town. However, there are two inactive landfills which were formerly used as municipal dumps. The Page Street landfill, which was closed in 1976, is in the eastern part of town far from the aquifers. However, the West Street landfill is in the aquifer area, about 1500 feet from Muddy Pond. This landfill has been closed since 1966, and the site is currently used by the town for a dog pound, a septage disposal facility, and field sports. There is currently no indication of problems with leachate or groundwater contamination at the former landfill.

Solid waste in the town is currently brought to a transfer station at Page Street, and from there it is hauled to a commercial landfill in East Bridgewater. The town has no plans to operate any landfills within Stoughton in the future.

5. Hazardous Wastes

a. Potential Impacts. Hazardous wastes are wastes which are toxic, reactive, corrosive or ignitable. Improper handling of hazardous wastes is an obvious threat to drinking waters; however, federal and state regulations have been enacted to reduce the threat of contamination, including water supply contamination. A less obvious source of hazardous wastes is what is commonly referred to as "household hazardous wastes." These include materials such as bleach, mothballs, paint remover, oven cleaner, wood preservative and used motor oil. Improperly disposed of, they also can reach groundwater or surface water and result in contamination of supplies. This is especially true in an unsewered area, such as in the water supply watershed. All materials disposed of "down the drain" will reach the groundwater through on-lot septic systems, which are not designed to treat many chemical wastes.

b. Land-Use Associations. All developed land use types have the potential to be associated with hazardous wastes. Thirty-five percent of the town is developed with residential, industrial, and commercial land uses. In addition, transportation corridors are susceptible to accidental spills.

Table 4-9

Stoughton Hazardous Waste Handlers

Faculty Name	Address	Activity Type	Regulatory Status
All Auto Body	1209 Washington St.	Gen	2
Acme Boot Company	2-16 Canton St.	Gen	2
Antons' Cleaner	490 Washington St.	Gen	2
Ark-Les Corporation	1490 Central St.	Gen	
Arts Chevrolet	287 Washington St.	Gen	2
Brookfield Engineering Lab	240 Cushing St.	Gen	2
Cyn Oil Corporation	1771 Washington St.	Gen-Tra-TSD	3
Donahue	55 Lambert Ave.		1
GPA Associates	12 Campinelli Pkwy.	Gen	2
Goddard Memorial Hospital	909 Sumner St.	Gen	2
Hansen Brothers Printing	602 Pleasant St.	Gen	2
Insurance Auto Body	950 Washington St.	Gen	2
Interface Engineering	383 Lindelof Ave.	Gen	2
Jet Line Services	441R Canton St.	Gen-Tra-TSD	4
One Hour Martinizing	599 Washington St.	Gen	2
Phillips FC Inc.	471 Washington St.	Gen	2
Quality Steel Products	1551 Central St.	Gen	2
Russard Inc.	187 Page St.		1
Shawmut Mills Division of RH Wyner Assoc.	208 Canton St.		1
Shell Service Station	386 Washington St.	Gen	2
Stanley Products	1561 Washington St.		1
Sterex Products	220 Cushing St.	Gen	2
Stoughton Auto Body	1069 Washington St.	Gen	2
Stoughton Dye House	20 Freeman St.	Gen	
Stoughton Tool & Dye Company	1063 Turnpike St.	Gen	2
Town of Stoughton	10 Pearl St.	Gen	2
System Engineering & Manufacturing Corporation Baker Brothers	44 Campanelli Pkwy.	Gen	2
Vongetti System Inc.	111 Island St.	Gen	
Wehsco	146 Campanelli Pkwy.	Gen	2
Yale Company Inc.	1438 Washington St.	Gen	

1 Activity Type: Gen = Generator; Tra = Transporter; TSD = Transport, Store, and Dispose.

2 Regulatory Status:
1 = Non-regulated (Non-handler)
2 = Non-regulated (Small Quantity)
3 = Interim Status
4 = Part A Withdrawal Candidate

c. Existing Conditions. According to EPA data under the Resource Conservation and Recovery Act (RCRA), there are 30 registered hazardous waste handlers in Stoughton (see table below). Only one of these, Jet Line Services, is considered to be a major handler. Twenty-four of the handlers are non-regulated under RCRA because they have "small quantity" or "non-handler" status under RCRA.

The only hazardous waste handler in the aquifer area is the Goddard Hospital. One other facility, on Island Street, is close to the aquifer, but downgradient from the wells.

Another potential source of hazardous materials is improperly disposed of household wastes. Thirty percent of the town is developed for residential use, and at least half of the homes dispose of their wastes in on-site systems. There are many unsewered areas within the aquifer area, some in close proximity to town wells.

Currently, there is no indication that hazardous wastes from either business or households have caused any groundwater contamination in Stoughton.

6. Pesticides.

a. Potential Impacts. The term pesticide includes insecticides, herbicides and rodenticides. These are all chemical compounds used to control unwanted organisms such as insects, weeds and rodents. Since the compounds vary depending upon their target organisms, their potential water resources effects also vary greatly. Pesticides may enter water supplies by direct infiltration through the ground or by way of runoff. Water supply impacts may be caused by improper use storage, or disposal of pesticide products. In some locations, even properly regulated application may have the potential to impact water supplies.

b. Land Use Associations. Land uses associated with use of pesticides are residential, institutional, transportation, utility (electrical), and agricultural and recreation. Homeowners use pesticides to control insects, weeds and rodents in gardens and homes. Municipal departments of public works often use herbicides for part or road maintenance. Golf courses often use herbicides and fungicides to maintain the turf.

Utility companies use selective pesticide applications to eliminate tall-growing trees which interfere with the function of the utility lines. The general amount herbicide used for this is less than one gallon per acre.

The intent of railroad herbicide applications is to control all vegetation along the track since it may cause instability or lead to fires. The area usually treated is about 12 feet to either side of the center of the track, known as the railroad layout or ballast area. A number of chemicals are used together which generally amount to 5 to 8 gallons of herbicide per acre.

Organic pesticides may be used directly in lakes and reservoirs for control of aquatic insects. Other methods of their reaching water bodies are accidental drift from agricultural applications, and discharge of rinse water from equipment cleanup after application.

c. Existing Conditions.

Potential sources of pesticides in or near the aquifer areas in Stoughton include the following:

- herbicide use for maintaining powerline rights of way in the southern part of town, near the Goddard Hospital Well;
- pesticide and fungicide use at the Cedar Hill Golf Course, which is 2,000 feet from the Goddard Street Well;
- pesticide use on cropland in the West Street area.

Currently, there is no indication of any contamination of water supplies by pesticides in Stoughton.

7. Mining

a. Characteristics and Water Supply Impacts. Mining poses a threat to groundwater if the excavation reaches too close to the water table, not leaving a sufficient buffer zone for contaminants to be filtered out. Future land uses on abandoned mines should also be carefully regulated, considering the potential groundwater impacts.

b. Land Use Associations. Mining; sand and gravel excavation.

c. Existing Conditions. In the aquifer area, there is one large sand and gravel mining area which is no longer actively mined. The site has had a 95-lot subdivision approved, and there is a proposal to amend the zoning to allow for condominiums.

A second smaller area is currently being mined by the town of Stoughton. This area is immediately adjacent to the new Pratt Court Well.

CHAPTER 5

ZONING AND REGULATION OF LAND USE

The preceding chapter focused on land uses which have potential impacts on water supplies. In this chapter, existing local, state, and federal laws and regulations which control those land uses will be summarized. The town's zoning bylaw will also be examined in order to determine the potential impacts of future development and its compatibility with water supply protection. This regulatory analysis will form the basis of the recommendations made in the next chapter to strengthen the town's water supply protection measures.

EXISTING REGULATIONS

A host of local, state, and federal laws and regulations currently exist which regulate some of the land uses identified in the previous chapter as having potential water supply impacts. These laws and regulations are summarized in Figure 5-1 and described below.

Underground Fuel Storage

- Federal. The Environmental Protection Agency is developing new requirements which will set minimum standards for state regulations.

- State. The Massachusetts Board of Fire Prevention Regulations has issued new state regulations governing underground fuel storage (527 CMR 9.00 et seq.). The regulations are proumulgated by the state Fire Marshall and enforced at the local level by the Fire Chief. The major features of the regulations are requirements for:

    - tank registration
    - periodic tank leak testing
    - inventory control
    - removal of abandoned tanks
    - non-corrosive tanks

  The state regulations greatly enhance protection against leaking of larger commercial underground fuel tanks. However, it should be noted that the regulations exempt residential and farm tanks for home heating oil less than 1100 gallons.

- Local. The Board of Selectmen issues licenses for gasoline storage tanks over 165 gallons and fuel oil storage tanks over 10,000 gallons. The Fire Cheif issues permits for fuel oil storage less than 10,000 gallons. In addition, the Stoughton Code (§ 59-28) requires all petroleum companies servicing underground gasoline tanks to perform leak tests every five years. However, the new state regulations exceed these requirements in that tanks over 15 years old must be tested every two years, and tanks over 20 years old must be tested annually. Further, the Stoughton bylaw specifies an air pressure test, which since enactment of the bylaw has been discontinued due to safety reasons. The standard industry tank test today is the Petrotite test or its equivalent.

Figure 5-1
Potential Impacts and Management Techniques

REGULATIONS	Uderground Fuel	Waste Water	Road Salt	Leachate	Hazardous Waste	Pesticides	Mining	Run Off Erosion
FEDERAL								
Resource Concervation & Recover Act (RCRA)					●			
Clean Water Act		●						
STATE								
Fire Prevention Regulations (527 CMR 9.0)	●							
DEQE Solid Waste Regulations (310 CMR 19)				●				
DEQE Hazardous Waste Regulations (310 CMR 30)					●			
Pesticide Bureau. Interim Guidelines						●		
TOWN								
Zoning Bylaw-					●			
Subdivision Regulatios								●
Board of Health		●		●				
Conservation Commission								●
Fire Department	●							
Earth Removal							●	

Potential Sources of Contamination

Wastewater

- o Federal. Industrial wastewater discharges are regulated under the federal Clean Water Act, which sets standards for discharges through the National Pollution Discharge Elimination System (NPDES) permit program. The NPDES permit program is implemented jointly by the federal Environmental Protection Agency and the state Department of Environmental Quality Engineering. The state has applied to EPA for delegation authority to administer the program itself. There are currently no NPDES permitted discharges in the town of Stoughton.

- o State/Local. Disposal of sanitary wastewater in on-site septic systems is regulated under Title 5 of the State Environmental Code. Title 5 empowers the local Boards of Health to administer and enforce the provisions of the State Ennvironmental Code. The regulations establish requirements for siting and construction of septic systems. The Title 5 regulations are considered minimum standards, and local Boards of Health may adopt more stringent measures to protect public health and the environment. Stoughton has adopted several measures which are more stringent than Title 5 standards, including a requirement that the leaching area be twice the size required by the state.

  Eaually important to protecting groundwater quality is the proper operation and maintenance of septic systems. Periodic inspection is necessary, and the septic tank must be pumped out when greases and solids accumulate. However, there are no state or local regulations which require proper operation and maintenance practices.

  Another threat to water quality is the disposal of hazardous materials in septic systems. Many household products contain toxic chemicals which are not properly treated by conventional septic systems. Even some septic system cleaners contain toxic chemicals. These materials should not be disposed of in septic systems.

Road Salt

There are no laws or regulations governing the application of road salt in Stoughton.

Leachate

- o Federal. There are no federal regulations concerning sanitary landfills.

- o State. Landfills are operated under state regulations administered by the Department of Environmental Quality Engineering (310 CMR 19.00). These cover site selection, construction, cover material, litter and dust control, drainage of surface water, and closure and final cover of the landfill.

  New state regulations have been drafted which afford much greater protection to groundwater. The new regulations require an impervious liner under the landfill, groundwater monitoring, runoff control, and landfill capping. Although not formally adopted as state regulations yet, DEQE is applying the new standards to new or expanded landfills.

Leachate (continued)

o Local. The Board of Health has responsibility for assigning sites fo sanitary landfills and transfer stations. The Board also has general powers under Chapter 111 to issue orders or regulations to protect the public health. There are currently no operating landfills in Stoughton. There are 2 former landfills which have been closed and capped.

Hazardous Wastes.

o Federal. Hazardous waste generation, treatment, storage, transportation, and disposal is regulated under the federal Resource Conservation and Recovery Act (RCRA). The Environmental Protection agency has delegated authority to the state of Massachusetts to administer and enforce the Act.

o State. The Massachusetts Hazardous Waste Management Act (Chapter 21 C) and the DEQE hazardous waste regulations (310 CMR 30) establish a system of control over hazardous wastes. All waste generators are registered, and all wastes produced (over a minimum quantity) are accounted for in a "cradle to grave" manifest system. All manifested wastes must be ultimately treateted and/or disposed of by a licensed facility. There are standards for facilities which treat, store, and dispose of hazardous wastes. However, there are currently no licensed disposal facilities in Massachusetts; thus, all hazardous wastes must be transported to licensed facilities out of state. Waste generators are classified as large quantity generators if they generate over 1000 kilograms per month o non-acutely hazardous wastes or more than 1 kilogram per month of acutely hazardous wastes. Quanitities of waste above the large quantity threshold must be removed from the site within 90 days. Of the 30 hazardous waste generators listed in Stoughton in the RCRA inventory, only Jet Line Services is classified as a large quantity generator.

o Local. There are no local regulations on hazardous wastes in Stoughton.

Pesticides

o Federal. The Environmental Protection Agency tests pesticide products and approves their use, with label instructions for proper application procedures and safeguards.

o State. Guidelines for the use of herbicides in utility and railroad right-of-way maintenance are being developed by the Pesticide Bureau in the Department of Food and Agriculture. Two sets of interim guidelines have been issued governing herbicide application. One regulates herbicide use on ballast areas of railroad layouts, and the other addresses herbicide use on both railroad and utility rights-of-way. Both sets of guidelines restrict application of herbicides within 400 feet of wells or surface water supplies, including tributary streams. Krenite is to be used between 50 and 400 feet of a water supply source. A 100 foot buffer is to be left on either side of a railroad ballast where it crosses a stream tributary to a surface water supply.

o Local. There are no town regulations concerning use of pesticides.

Mining (Sand and Gravel Extraction)

- o Federal. There are no federal regulations regarding sand and gravel extraction.
- o State. There are no state regulations regarding sand and gravel extraction.
- o Local. Article XI-B of the Stoughton Zoning Bylaw includes Earth Removal Regulations. A special permit for earth removal must be obtained from the Board of Appeals. Permit conditions may specify the area and depth of excavation, however no specific standards are established by the bylaw. The bylaw also requires a Land Reuse Plan to be drawn up to guide the use and development of the site after excavation activities have ended.

ZONING: REGULATION OF FUTURE LAND USE

The preceding section summarized the laws and regulations which govern existing land uses in the town of Stoughton. The Zoning Bylaw determines the type and intensity of land uses which may occur in the future within defined districts of the town. As such, it is one of the most important tools at the town's disposal to insure the long-term protection of its water supply resources. By defining critical water resource areas and properly regulating land uses within those areas, the town can insure that incompatible or hazardous land uses do not threaten the quality or quantity of groundwater in the future. Sound management of land use in the critical water resource areas will not only protect the public health, but it will also help prevent a contamination incident which could cost the town millions of dollars in clean-up and treatment costs.

Stoughton's Zoning Bylaw is summarized below, with an emphasis on those aspects which could affect the quality or quantity of the town's groundwater resources.

Zoning Districts

The Zoning Bylaw establishes five kinds of residential districts, four kinds of business districts, and one industrial district. The location of these districts is shown on the Zoning Map in Figure 5-2. As shown on Figure 5-2, the water supply aquifer lies within three of the residence districts, R-15, R-20, and R-30. The density and dimensional requirements associated with each zoning district are summarized in Figure 5-3 and the use regulations are summarized in Figure 5-4. Each of the zoning districts is described below.

Residence. The three residence districts which occupy the aquifer area require minimum lot areas of 25,000 square feet (R-15), 30,000 square feet (R-20). and 45,000 square feet (R-30). The maximum building area is 25 percent for the R-15 district, and 20 percent for the R-20 and R-30 districts. All three districts require a minimum of 50 percent open space.

The principal uses permited include one-family residences, churches, schools, parks, town buildings, public utilities, underground fuel oil storage, agriculture, cemetaries, and conservation. Uses allowed by Special Permit include

hospitals and nursing homes, livestock, country clubs, and drainage facilities. In the R-20 and R-30 districts only, Special Permit uses also include cluster residential, quarries and sand and gravel removal, and commercial forestry.

The potential impacts on groundwater of the uses permitted in the residence districts include reduction of groundwater recharge due to impervious surfaces use of road salts, pesticides, and fertilizers which can introduce contaminants into groundwater, leaking underground residential heating oil tanks, and wastewater effluent from septic systems in unsewered areas. Improper disposal of household hazardous wastes may also pose a danger to groundwater.

Figure 5-3

DIMENSIONAL AND DENSITY REQUIREMENTS

DISTRICT	MINIMUM LOT AREA (square feet)	MAXIMUM BUILDING AREA (Percent)	MINIMUM OPEN SPACE (%)
RESIDENCE			
R-M	6,000 + 1000/unit	30	30
*R-8	22,000	30	50
*R-15	25,000	25	50
*R-20	30,000	20	50
R-30	45,000	20	50
BUSINESS			
CBD	2,500	90	0
GB	5,000	70	10
NB	5,000	50	20
HB	10,000	40	30
INDUSTRY			
I	40,000	50	25

*Note: All of aquifer area is within Residence Districts R-15, R-20, and R-30.

Business and Industry. These kinds of districts generally pose a greater threat to groundwater than residence districts. Fortunately for Stoughton, there are no Business or Industry districts within the water supply aquifer. However, there is an industry district which covers a potential aquifer area in south-central Stoughton. The aquifer is not currently used for public water supply, but it may have the potential to be a source of water in the future.

Figure 5-4
SUMMARY OF USE REGULATIONS

	DISTRICTS									
USES	RESIDENTIAL					BUSINESS				INDUSTRY
	R-M	R-8	R-15	R-20	R-30	OBD	GB	NB	HB	I
PRINCIPAL USES										
Residential										
One-family dwelling	-	P	P	P	P	-	-	-	-	-
Two-family dwelling	P	P	-	-	-	-	-	-	-	-
Multi-family dwelling	P	-	-	-	-	S	-	-	-	-
Cluster residential	-	-	-	S	S	-	-	-	-	-
Conversion - 4 units maximum	P	S	-	-	-	S	S	-	-	-
Planned Multifamily Development	P	-	-	-	-	S	-	-	-	-
Elderly Housing	P	S	S	-	-	-	-	-	-	-
Conversion - 5 units maximum	S	S	-	-	-	S	S	-	S	-
Community Facilities										
Church	P	P	P	P	P	P	P	P	P	P
Education (public/private)	P	P	P	P	P	P	P	P	P	P
Park, Conservation, Open Space	P	P	P	P	P	P	P	P	P	P
Country club, golf, etc.	-	-	S	S	S	-	-	-	-	-
Town building	P	P	P	P	P	-	P	P	P	P
Cemetary	P	P	P	P	P	-	P	P	P	P
Hospital	-	-	S	S	S	-	-	-	-	-
Nursing home	-	S	S	S	S	-	-	-	-	-
Town garage	-	-	-	-	-	-	P	-	P	P
Public utility	P	P	P	P	P	-	P	P	P	P
Power plant, water/sewer plant	-	P	-	-	-	-	-	-	-	P
Underground fuel - distribution	P	P	P	P	P	P	P	P	P	P
Refuse Transfer Station	-	-	-	-	-	-	-	-	-	P
Agriculture										
Agriculture, horticulture	P	P	P	P	P	-	P	-	P	P
Greenhouse	-	-	-	-	-	-	S	-	P	P
Livestock	-	S	S	S	S	-	-	-	-	-
Stables, kennels, vetinary hospital	-	-	-	-	-	-	S	-	S	-
Commercial Forestry	-	-	-	S	S	-	-	-	-	S
Retail & Trade										
Retail establishment	-	-	-	-	-	P	P	P	P	-
Auto dealership	-	-	-	-	-	-	-	-	P	-
Funeral home	S	S	-	-	-	-	P	P	P	-
Auto repair/service station	-	-	-	-	-	-	-	-	S	S
Junkyard	-	-	-	-	-	-	-	-	S	S
Drainage Facilities	S	S	S	S	S	S	S	S	S	S
Wholesale Transportation, Industrial										
Quarry, sand & gravel removal	-	-	-	S	S	-	-	-	S	S
Processing raw materials	-	-	-	-	-	-	-	-	S	S
Construction	-	-	-	-	-	-	-	-	S	P
Manufacturing	-	-	-	-	-	-	-	-	P	P
Laundry/Dry-cleaning plant	-	-	-	-	-	-	-	-	S	P
Truck terminal	-	-	-	-	-	-	-	-	S	P
Wholesale distrícution (fuel)	-	-	-	-	-	-	-	-	P	P
Printing/publishing (less than 6000 s.f.)	-	-	-	-	-	S	P	-	P	P
Printing/publishing (greater than 6000 s.f.)	-	-	-	-	-	-	-	-	-	P
Waste Disposal	-	-	-	-	-	-	-	-	-	P
ACCESSORY USES										
Home occupation	S	S	S	S	S	-	P	P	P	-
Accessory building	P	P	P	P	P	-	P	P	P	-
Accessory outside storage	-	-	-	-	-	-	S	-	S	P
Accessory gas storage	-	-	-	-	-	-	S	S	P	P
Accessory livestock	S	S	S	S	S	-	S	S	S	S
Sand & gravel removal	S	S	S	S	S	S	S	S	S	S

NOTE: All of aquifer area is within Residential Districts R-15, R-20, and R-30

Flood Hazard, Wetlands, and Watershed Districts

In addition to the ten use districts described above, the Zoning Bylaw defines an overlay district known as the Flood Hazard, Wetlands, and Watershed District. This district includes lands subject to inundation during the 100 year storm; wetlands as defined by the state statute, and a 100 foot buffer around each of these two kinds of of areas, called "watershed areas." These districts are delineated on Figure 5-5. The major features of the bylaw are summarized below.

Use Regulations. In the Flood Hazard and Wetlands Districts, permitted uses include conservation, wildlife management, farming, forestry, nurseries, livestock, recreation, pre-existing structures (with up to 40 percent increase in lot coverage), pre-existing septic systems, and utilities. In the Watershed District, uses permitted in the underlying zoning districts are permited, except that within 25 feet of a Flood Hazard or Wetlands District, the following uses are prohibited: new buildings or structures, paving, dumping, filling, or earth transfer or relocation.

Special Conditions on Uses. In addition to the use regulations outlined above, the following special conditions are imposed on all uses:

- no septic systems may be located within 25 feet of the Flood Hazard or Wetlands districts
- no more than 25 percent of a approved building lot may be located within a Flood Hazard or Wetland disrtict
- no more than 20 percent of a Flood Hazard district within an industrial parcel may be filled, paved, or altered.

Special Permits. Applications for special permits under the bylaw are made to the Board of Appeals. The application must include a site plan which shows, among other things, an estimate of the maximum groundwater elevation occurring between December and April, based on at least one sample.

SUBDIVISION REGULATIONS

The Stoughton subdivision regulaltions contain the following provisions relevant to protection of water resources:

- Board of Health approval of all Definitive Plans is required. The Board may specify which, if any, of the lots shown on the plan cannot be used for building sites without injury to the public health.
- Preliminary Plans must include a general proposed plan for surface and sanitary drainage for the entire tract.
- Definitive Plans must include a plan for surface and sanitary drainage for the entire tract, including profiles which show the size, location, and gradient of storm water drains, catch basins, and sanitary sewers. Drainage calculations must be provided for review by the town engineer.
- Design and construction standards: private on-lot water systems must be set back 50 feet from septic tanks, 100 feet from leaching fields, seepage pits, or cesspools. If a public sewerage system is within 400 feet of the subdivision, all lots must be connected to it.

- Natural features, including water courses, must be preserved.

- Environmental Impact Statement: must be prepared by a Registered Professional Engineer for subdivisions of more than lots. The EIS must address air, noise, land, wildlife, land use, zoning, water supply, sewage, storm drainage, solid waste disposal, traffic, energy, community services, and economic considerations. However, groundwater and water quality are not addressed.

CHAPTER 6

FINDINGS AND RECOMMENDATIONS

The previous chapters have examined the potential water quality impacts of existing land uses and of potential future land uses permitted under the current zoning bylaw. Existing laws, bylaws and regulations to conrtol potential sources of contamination were reviewed, and their adequacy for groundwater protection was evaluated. As a result of these analyses, in this chapter new or amended bylaws and regulations will be recommended to strengthen the town's protection of its groundwater resources. These recommendations can be drawn together into a comprehensive groundwater protection program as outlined below.

GROUNDWATER PROTECTION PROGRAM

ZONING

Findings. Stoughton is fortunate that its existing water supply aquifer is zoned residential, thus avoiding the higher risk land uses usually permitted under industrial and commercial districts. However, the zoning analysis showed that a host of non-residential uses are permitted in districts which are nominally "residential". Further, site coverage of up to 50 percent is permitted, and building areas of up to 30 percent. This degree of coverage can have a detrimental affect on groundwater recharge rates.

In addition, there is an aquifer in south-central Stoughton which may have the potential to be a future water supply source. This aquifer is partially within an industrial district.

Recommendations. The zoning bylaw should be amended by adding an Aquifer Protection Overlay District. The boundaries of the district would be defined as the sand and gravel aquifer mapped by Weston Geophysical Co. (see Figure 3-1), covering the western portion of Stoughton. Five of the town's water sources lie within this aquifer, and the new Pratts Court well is on the border of it. The town should conduct additional hydrogeologic studies to determine the area of contribution to the new Pratts Court and Goddard wells, and to assess the potential of the other aquifer in south-central Stoughton.* When the data is available to determine these areas, they should also be incorporated into the Aquifer Protection District.

The Aquifer Protection District would overlay existing zoning districts, adding additional requirements, much as the existing Floodplain/Wetland/Watershed District does. The requirements include a prohibition of uses such as disposal of solid waste or liquid or leachable wastes, discharge of industrial wastewater on-site, storage of petroleum products underground, storage of road salt, animal feedlots, storage or disposal of hazardous wastes, automobile service and repair shops, and junk and salvage yards. In order to maintain groundwater recharge, no more than 10 percent of any lot may be rendered impervious. A model Aquifer Protection District bylaw is in Appendix A.

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*Ideally, the area of contribution, or Zone II as defined by DEQE, should be determined for all puming wells in the town, and these areas should be included in the Aquifer Protection District.

EARTH REMOVAL REGULATIONS

Findings. Excavation to a depth of less than ten feet above the water table has potential impacts on groundwater quantity and quality. Excavation too close to the water table can also place constraints on developing the site for other uses after mining activities have ended. In effect, high water table conditions can be created artificially under these circumstances. making site reclamation difficult. The Stoughton zoning bylaw includes Earth Removal Regulations which state that the depth of excavation may be specified as a permit condition, but no standards for excavation depth are included.

Recommendations. The zoning bylaw should be amended to require that the maximum depth of excavation be at least ten (10) feet above the seasonal high water table. The water table elevation should be determined on site by soil borings and test wells which are monitored through at least one high water season, from December to April.

UNDERGROUND FUEL STORAGE REGULATIONS

Findings. State Fire Prevention Regulations require registration of all commercial underground fuel tanks and periodic leak testing (527 CMR 9.00). However, residential tanks less than 1100 gallons are exempted from these requirements. These are typically unprotected steel tanks, many of which are quite old. In Stoughton, there are at least 134 of these tanks in the vicinity of the aquifer area, 76 of which are more than 15 years old. In general, unprotected steel tanks have a life expectancy of 15 years in the typically corrosive soils of Massachusetts.

Recommendations. All underground fuel tanks within the aquifer area should be tested periodically, including residential underground tanks (this does not apply to tanks installed indoors in basements or outdoors above ground). Due to the substantial cost of tank testing (about £500) the town should consider beginning by requiring a tank test at the time of sale or transfer of a home with an underground tank in the Aquifer Protection District. There are indications that less expensive tank testing methods may soon be available. If and when more affordable tests become available, the regulation could be amended to require periodic tests of all underground tanks in the Aquifer Protection District. The results of any tank tests should be added to the tank registration inventory kept by the Fire Department.

SUBDIVISION REGULATIONS

Findings. The town's subdivision regulations contain provisions for the regulation of surface drainage and runoff, but there are no provisions which directly take groundwater into consideration.

Recommendations. The Planning Board should amend the subdivision regulations by adding a provision which allows the Board to require information on groundwater resources, impacts, and mitgation measures. This provision would be optional and applied in appropriate cases at the discretion of the Planning Board. It should allow the Board to require such information as water table elevations, direction of groundwater flow, nutrient loading, and impacts on aquifers or recharge areas for public water supplies. Mitigation measures to be analyzed may include open and closed drainage systems oil and grease separators, and detention basins for contaminant removal.

The amendment should allow the Board to require appropriate mitigation measures to protect groundwater quality and quantity.

HOUSEHOLD HAZARDOUS WASTES

Findings. Although the aquifer area is primarily residential in character, there are many household products which pose a potential threat to water quality if improperly disposed of. These include cleaners, solvents, polishes, paints, lubricants, antifreeze, and motor oil.

Recommendations. The town should conduct household hazardous waste collections on an annual basis, taking advantage of state financial assistance when available. Publicity for the collections should especially focus on the Aquifer Protection District. As part of this effort, there should be a public education campaign to discourage the improper disposal of household hazardous wastes. The town could also investigate the feasibililty of operating a waste oil recycling project at the transfer station.

APPENDIX A

AQUIFER PROTECTION DISTRICT

SECTION I

Definitions

Animal Feedlot:	A plot of land on which 25 livestock or more per acre are kept for the purposes of feeding.
Aquifer:	Geologic formation composed of rock or sand and gravel that contains significant amounts of potentially recoverable potable water.
Groundwater:	All the water found beneath the surface of the ground. In this bylaw the term refers to the slowly moving subsurface water present in aquifers and recharge areas.
Impervious Surface:	Material on the ground that does not allow surface water to penetrate into the soil.
Leachable Wastes:	Waste materials including solid wastes, sewage, sludge, and agricultural wastes that are capable of releasing water-borne contaminants to the surrounding environment.
Mining of Land:	The removal or relocation of geologic materials such as topsoil, sand and gravel, metallic ores, or bedrock.
Recharge Areas:	Areas composed of permeable stratified sand and gravel and certain wetlands that collect precipitation or surface water and carry it to aquifers.
Solid Wastes:	Useless, unwanted, or discarded solid material with insufficient liquid content to be free flowing. This includes but is not limited to rubbish, garbage, scrap materials, junk, refuse, inert fill material and landscape refuse.

SECTION II

Purpose of District

The purpose of this Aquifer Protection District is:

(A) to promote the health, safety, and general welfare of the community;

(B) to protect, preserve and maintain the existing and potential groundwater supply and groundwater recharge areas within the town;

(C) to preserve and protect present and potential sources of water supply for the public health and safety;

(D) to conserve the natural resources of the town;

(E) to prevent blight and the pollution of the environment.

SECTION III

Scope of Authority

The Aquifer Protection District shall be considered as overlying other zoning districts. No uses not permitted in the portions of the districts so overlaid shall be permitted in this district.

SECTION IV

Establishment and Delineation of Aquifer Protection District

For the purposes of this district, there are hereby established within the town certain aquifer protection areas, consisting of aquifers and/or aquifer recharge areas, which are delineated on a map at a scale of 1 inch to ____ feet entitled "Aquifer Protection Areas, Town of ________________." This map is hereby made a part of this district and of the town zoning bylaw and is on file in the Office of the Town Clerk.

SECTION V

Use Regulations

Within the Aquifer Protection District, these regulations shall apply:

A. The following uses are permitted within the Aquifer Protection District, subject to s. B, provided that all necessary permits, orders, or approvals required by local, state, or federal law are also obtained:

1. conservation of soil, water, plants and wildlife;

2. outdoor recreation, nature study, boating, fishing, and hunting where otherwise legally permitted;

3. foot, bicycle and/or horse paths and bridges;

4. normal operation and maintenance of existing water bodies and dams, splash boards, and other water control, supply and conservation devices;

5. maintenance, repair [and enlargement] of any existing structure provided there is no increase in impermeable pavement;

6. residential development[1], if permitted in the underlying district, provided that no more than 10 percent of a building lot (including the portion of any new street abutting the lot) is rendered impervious.[2]

7. farming, gardening, nursery, conservation, forestry, harvesting and grazing provided that fertilizers, herbicides, pesticides, manure and other leachable materials are not stored outdoors.[3]

[8. Optional: creation of ponds up to one acre in size.]

B. The following uses are prohibited:

1. disposal of solid wastes, other than brush and stumps;

2. storage of petroleum or other refined petroleum product except within buildings which it will heat;

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[1] The use of pesticides and fertilizers in connection with these activities may be made subject to reasonable regulations (see Ch. 2).

[2] Larger parking areas, if required, must be constructed with permeable paving.

[3] The community may install test wells to monitor for contamination by herbicides, pesticides or fertilizers.

3. the disposal of liquid or leachable wastes, except one- or two-family residential subsurface waste disposal systems;

4. the rendering impervious of more than 10% of any lot;

5. industrial uses which discharge process wastewater on-site;

6. [use or] storage of road salt or other deicing chemicals;

7. dumping of snow containing deicing chemicals which is brought in from outside the district;

8. animal feedlots;

9. the storage of uncovered manure;

10. mining of land except as incidental to a permitted use;

11. the storage or disposal of hazardous wastes, as defined by the Hazardous Waste Regulations promulgated by the Hazardous Waste Board, the Water Resources Commission, and the Division of Water Pollution Control under the provisions of Sections 27(8), 52, 57, and 58 of Chapter 21 of the General Laws.

12. Automotive service and repair shops, junk and salvage yards.

C. The following uses are permitted by Special Permit, subject to the approval of the [Special Permit Authority] under such conditions[4] as they may require and also subject to s. 3:

1. the application of pesticides for non-domestic or non-agricultural uses provided that all necessary precautions shall be taken to prevent hazardous concentrations of pesticides in the water and on the land within the Aquifer Protection District as a result of such application. Such precautions include, but are not limited to, erosion control techniques, the control of runoff water (or the use of pesticides having low solubility in water), the prevention of volatilization and redeposition of pesticides and the lateral displacement (i.e. wind drift) of pesticides;[5]

2. the application of fertilizers for non-domestic or non-agricultural uses provided that such application shall be made in such a manner as to minimize adverse impacts on surface and groundwater due to nutrient transport and deposition and sedimentation;

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[4] The SPA should establish regulations under this section to insure against contamination and loss of recharge by such means as water-tight sewer pipes, ban on road salt, erosion control, preservation of ground cover, permeable paving, maintenance of catch basins.

[5] See note on pesticides in the Watershed Protection bylaw in ch. 2.

3. those commercial and industrial activities permitted in the underlying district with a site plan review* to prevent compaction and siltation, loss of recharge, exfiltration for sewer pipes and contamination by oil, chemicals, nutrients, etc.

D. Procedures for Issuance of Special Permit

1. Each application for a special permit shall be filed with the [Special Permit Authority] and shall be accompanied by ___ copies of the plan.

2. Said application and plan shall be prepared in accordance with the data requirements of the proposed development, (e.g., site plan review, erosion and sedimentation control plan, etc.)

3. The [SPA] shall refer copies of the application to the Board of Health, Planning Board, the Conservation Commission and Town Engineer/Department of Public Works, which shall review, either jointly or separately, the application and shall submit their recommendations to the [SPA]. Failure to make recommendations within 35 days of the referral of the application shall be deemed lack of opposition.

4. The [SPA] shall hold a hearing, in conformity with the provisions of G.L. ch. 40A, s. 9, within 65 days after the filing of the application and after the review by the town/boards/departments.

   Notice of the public hearing shall be given by publication and posting and by first-class mailings to "parties in interest" as defined in G.L. ch. 40A, s. 11. The decision of the [SPA] and any extension, modification or renewal thereof, shall be filed with the [SPA] and Town Clerk within 90 days following the closing of the public hearing. Failure of the special permit granting authority to act within 90 days shall be deemed as a granting of the permit. However, no work shall commence until a certification is recorded as required by said s. 11.

5. After notice and public hearing, and after due consideration of the reports and recommendations of the boards/departments, the [SPA] may grant such a special permit provided that it finds that the proposed use:

   (a) is in harmony with the purpose and intent of this bylaw and will promote the purposes of the Aquifer Protection District;

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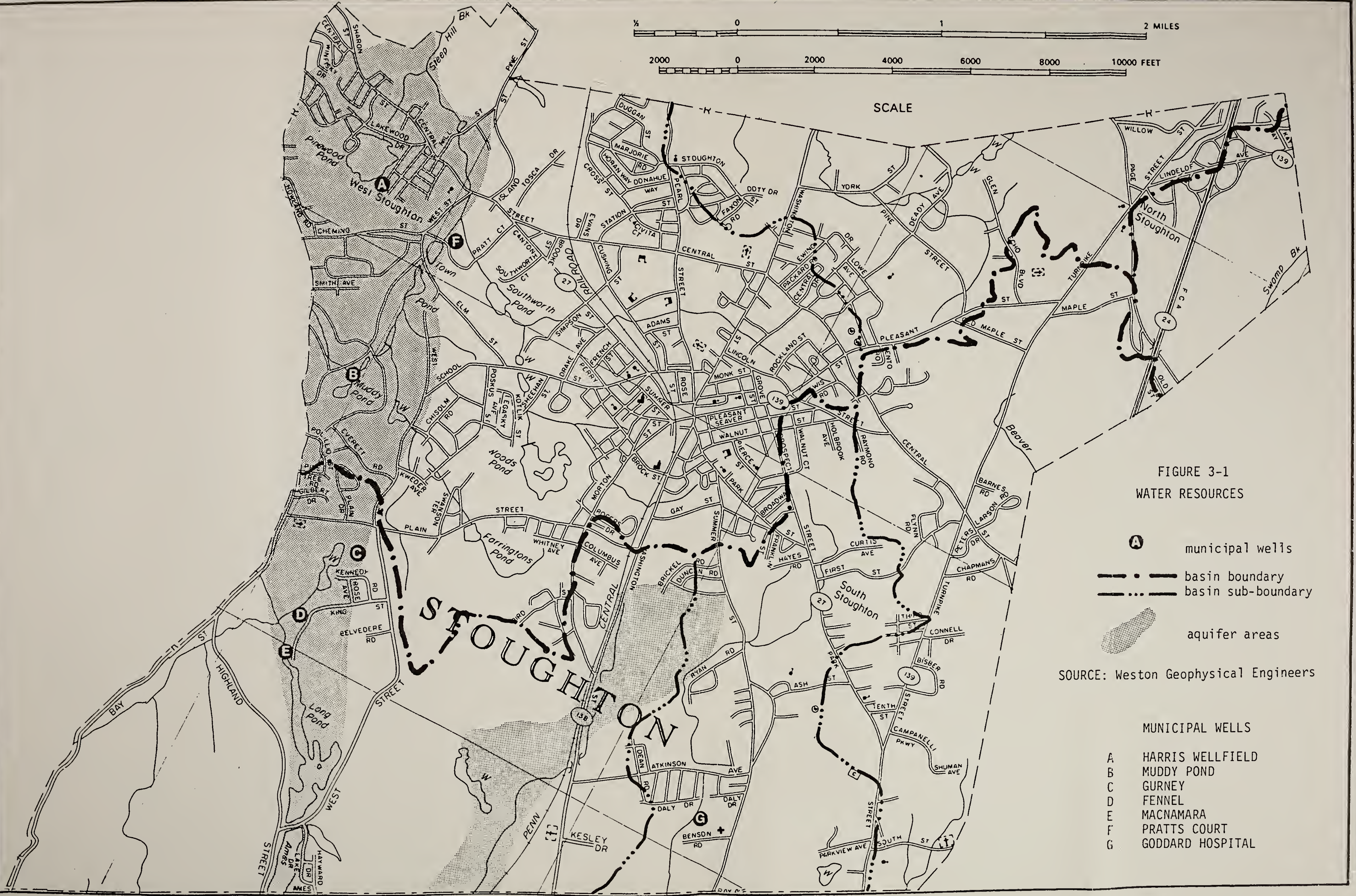
*See MAPC's Growth Management Techniques (April 1978) for a site plan review model.

(b) is appropriate to the natural topography, soils, and other characteristics of the site to be developed;

(c) will not, during construction or thereafter, have an adverse environmental impact on the aquifer or recharge area; and

(d) will not adversely affect an existing or potential water supply.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South Stoughton
Pinewood Pond
Steep Hill Bk
Town Pond
Southworth Pond
Muddy Pond
Woods Pond
Farringtons Pond
Long Pond
Ames
Swamp Bk
Beaver
RAILROAD
CENTRAL ST
WASHINGTON ST
PARK STREET
TURNPIKE
BAY ST
HIGHLAND
WEST STREET
PLEASANT ST
CENTRAL ST
PLAIN STREET
SCHOOL ST
ELM ST
MAPLE ST
CHEMING ST
PRATT CT
ATKINSON AVE
DALY DR
BENSON RD
KESLEY DR
SOUTH ST
ASH ST
FIRST ST
TENTH ST
CAMPANELLI PKWY
SHUMAN AVE
CONNELL DR
CHAPMANS RD
BARNES RD
LARSON RD
PETERS DR
CURTIS AVE
HAYES RD
GAY ST
ROGERS DR
COLUMBUS AVE
WHITNEY AVE
BRICKEL RD
DUNCAN RD
RYAN RD
PENN
KING ST
BELVEDERE RD
KENNEDY RD
ROSE AVE
GILBERT DR
EVERETT RD
KWEDER AVE
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SUMMER ST
ROSE ST
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GROVE ST
ROCKLAND ST
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PROSPECT ST
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BROADWAY
FRANKLIN ST
BROCK ST
MORTON ST
RAYMOND RD
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DEADY AVE
GLEN ECHO BLVD
WILLOW ST
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LINDELOF AVE
DUGGAN ST
MARJORIE RD
HORAN WAY
DONAHUE WAY
CROSS ST
PEARL STREET
FAXON RD
DOTY DR
STATION ST
LACIVITA CT
CUSHING ST
EVANS DR
BROOKE DR
SOUTHWORTH CT
CANTON ST
ISLAND ST
TOSCA DR
LAKEWOOD DR
CENTRAL ST
SHARON ST
WINFISKY DR
PINE ST
SMITH AVE
HOWE ST
ADAMS ST
ST
27
24
138
139
A
B
C
D
E
F
G
W
municipal wells
basin boundary
basin sub-boundary
aquifer areas

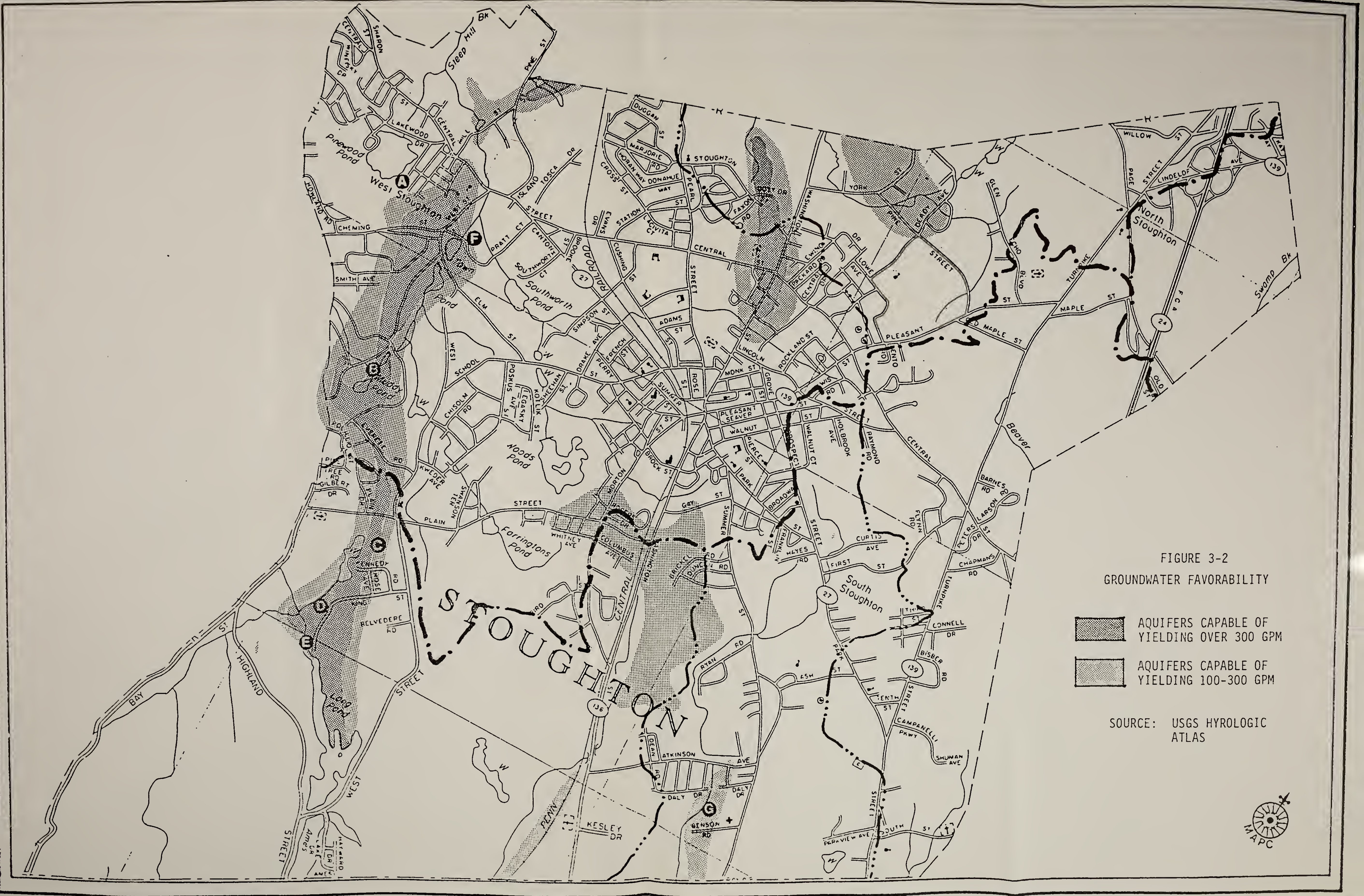
FIGURE 3-1

WATER RESOURCES

SOURCE: Weston Geophysical Engineers

MUNICIPAL WELLS

A	HARRIS WELLFIELD
B	MUDDY POND
C	GURNEY
D	FENNEL
E	MACNAMARA
F	PRATTS COURT
G	GODDARD HOSPITAL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North Stoughton
South Stoughton
Pinewood Pond
Southworth Pond
Woods Pond
Farringtons Pond
Long Pond
Sleep Hill Bk
Swamp Bk
Beaver
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WASHINGTON ST
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SUMMER ST
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MAPLE ST
YORK ST
WILLOW ST
PAGE STREET
LINDELOF AVE
CHEMING RD
SMITH AVE
LAKEWOOD DR
ISLAND STREET
TOSCA DR
ATKINSON AVE
DALY DR
BENSON RD
KESLEY DR
PENN
RAILROAD
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AQUIFERS CAPABLE OF YIELDING OVER 300 GPM
AQUIFERS CAPABLE OF YIELDING 100-300 GPM
MAPC

FIGURE 3-2
GROUNDWATER FAVORABILITY

SOURCE: USGS HYROLOGIC ATLAS

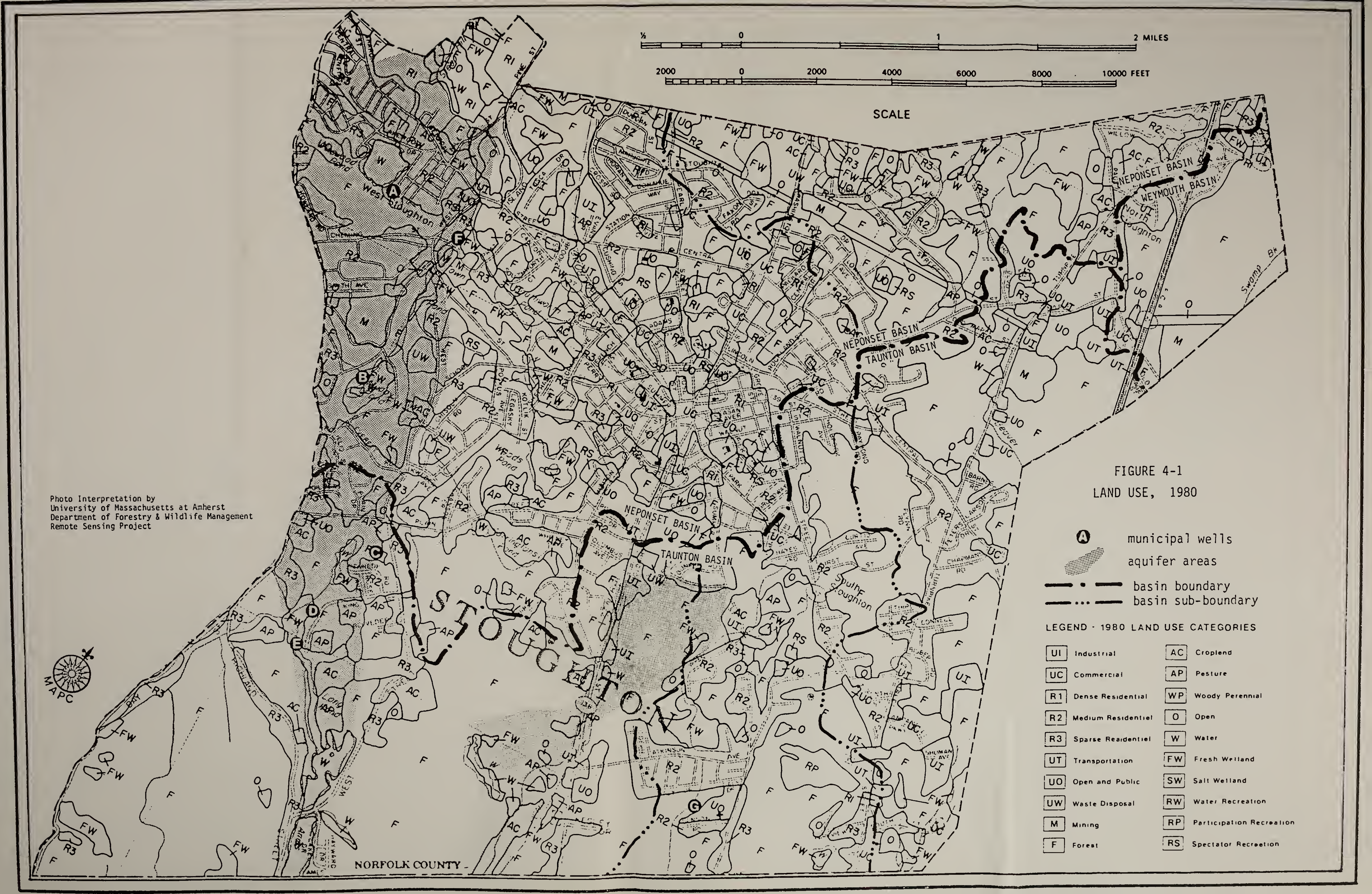
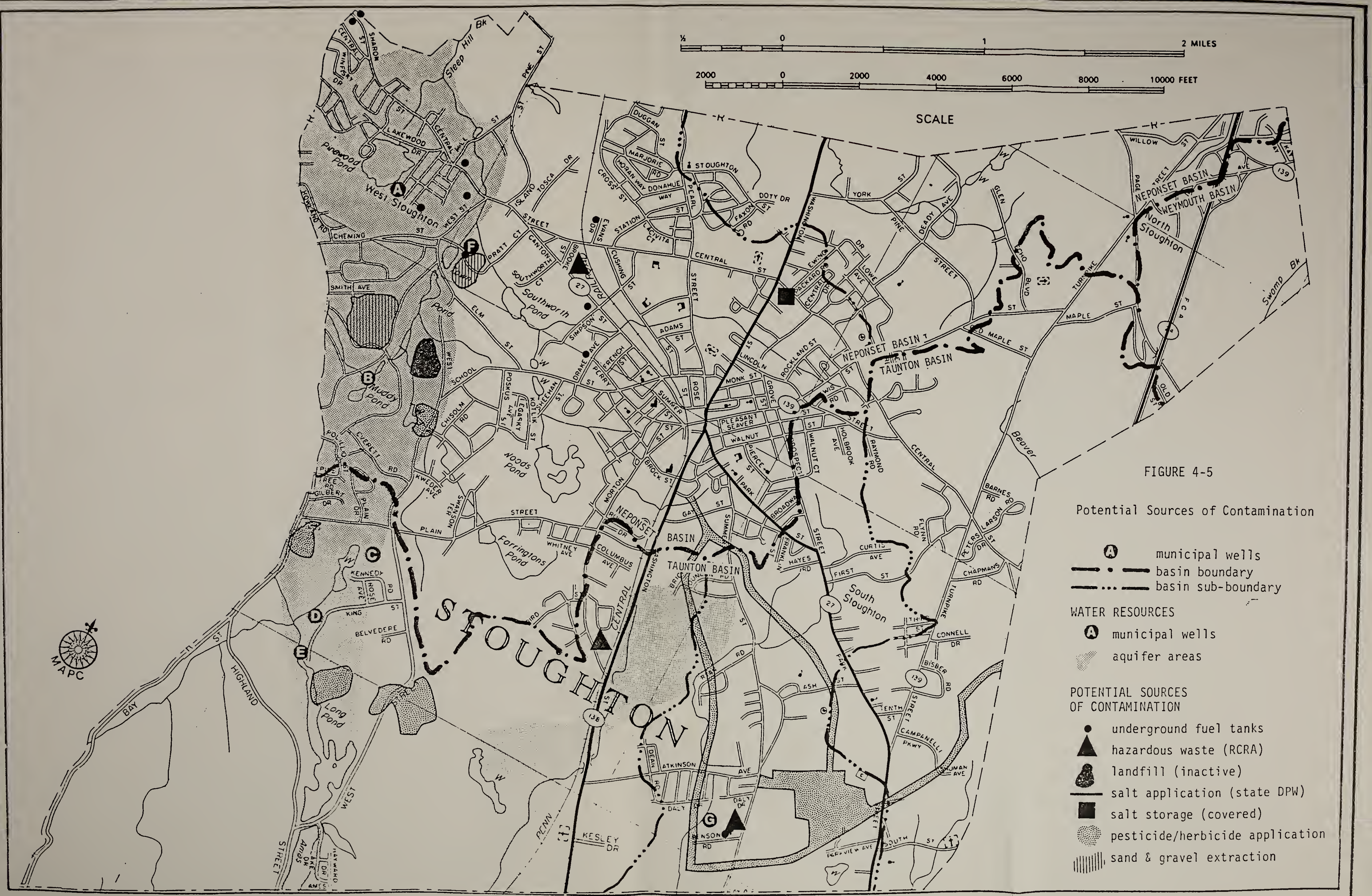


FIGURE 4-1
LAND USE, 1980

Photo Interpretation by
University of Massachusetts at Amherst
Department of Forestry & Wildlife Management
Remote Sensing Project

SCALE
½ 0 1 2 MILES
2000 0 2000 4000 6000 8000 10000 FEET
A municipal wells
aquifer areas
basin boundary
basin sub-boundary
LEGEND - 1980 LAND USE CATEGORIES
UI Industrial
UC Commercial
R1 Dense Residential
R2 Medium Residential
R3 Sparse Residential
UT Transportation
UO Open and Public
UW Waste Disposal
M Mining
F Forest
AC Cropland
AP Pasture
WP Woody Perennial
O Open
W Water
FW Fresh Wetland
SW Salt Wetland
RW Water Recreation
RP Participation Recreation
RS Spectator Recreation
STOUGHTON
NEPONSET BASIN
TAUNTON BASIN
WEYMOUTH BASIN
NORFOLK COUNTY
West Stoughton
North Stoughton
South Stoughton
Woods Pond
MAPC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Swamp Bk
Beaver
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SHARON
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COLUMBUS AVE
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FRANKLIN
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CURTIS AVE
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FLYNN RD
BARNES RD
LARSON RD
PETERS DR
CHAPMANS RD
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BELVEDERE RD
BAY
HIGHLAND
WEST
STREET
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HAYWARD
PENN
KESLEY DR
DEAN RD
ATKINSON AVE
DALY DR
BENSON RD
SOUTH ST
FAIRVIEW AVE
CAMPANELLI PKWY
TENTH ST
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CONNELL DR
BISBEE RD
STREET
TURNPIKE
FCA
OLD ST
27
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FIGURE 4-5

Potential Sources of Contamination

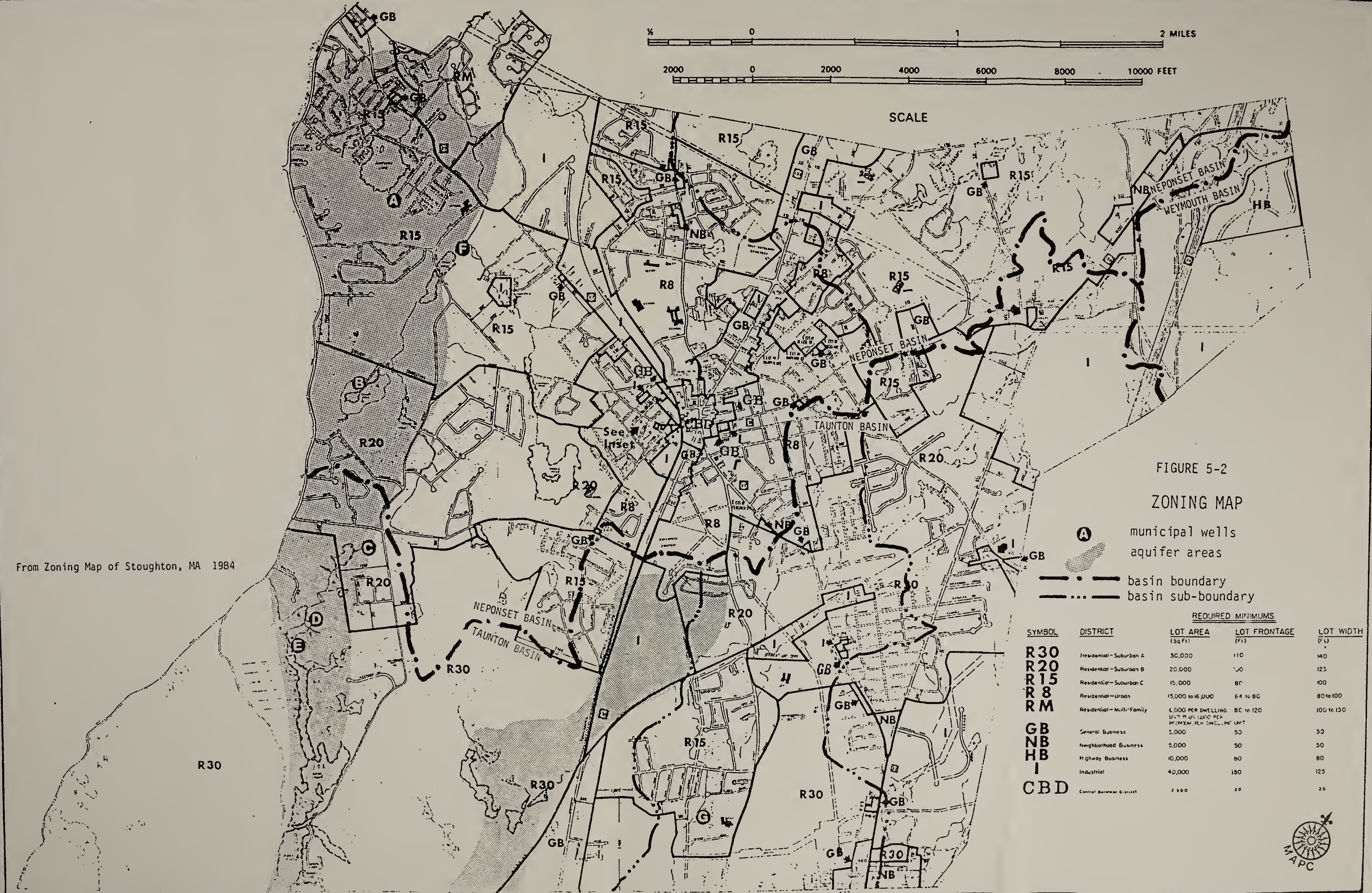
Ⓐ	municipal wells
—·—	basin boundary
—···—	basin sub-boundary

WATER RESOURCES

Ⓐ	municipal wells
▨	aquifer areas

POTENTIAL SOURCES OF CONTAMINATION

●	underground fuel tanks
▲	hazardous waste (RCRA)
■	landfill (inactive)
—	salt application (state DPW)
■	salt storage (covered)
▨	pesticide/herbicide application
▥	sand & gravel extraction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TAUNTON BASIN
WEYMOUTH BASIN
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G
MAPC

From Zoning Map of Stoughton, MA 1984

FIGURE 5-2

ZONING MAP

Ⓐ municipal wells

▨ aquifer areas

—·— basin boundary

—···— basin sub-boundary

SYMBOL	DISTRICT	REQUIRED MINIMUMS LOT AREA (Sq Ft)	LOT FRONTAGE (Ft)	LOT WIDTH (Ft)
R30	Residential – Suburban A	30,000	110	140
R20	Residential – Suburban B	20,000	100	125
R15	Residential – Suburban C	15,000	80	100
R8	Residential – Urban	15,000 to 16,000	64 to 80	80 to 100
RM	Residential – Multi-Family	6,000 PER DWELLING UNIT PLUS 1,000 PER BEDROOM PER DWELLING UNIT	80 to 120	100 to 130
GB	General Business	5,000	50	50
NB	Neighborhood Business	5,000	50	50
HB	Highway Business	10,000	80	80
I	Industrial	40,000	180	125
CBD	Central Business District	2,500	20	20

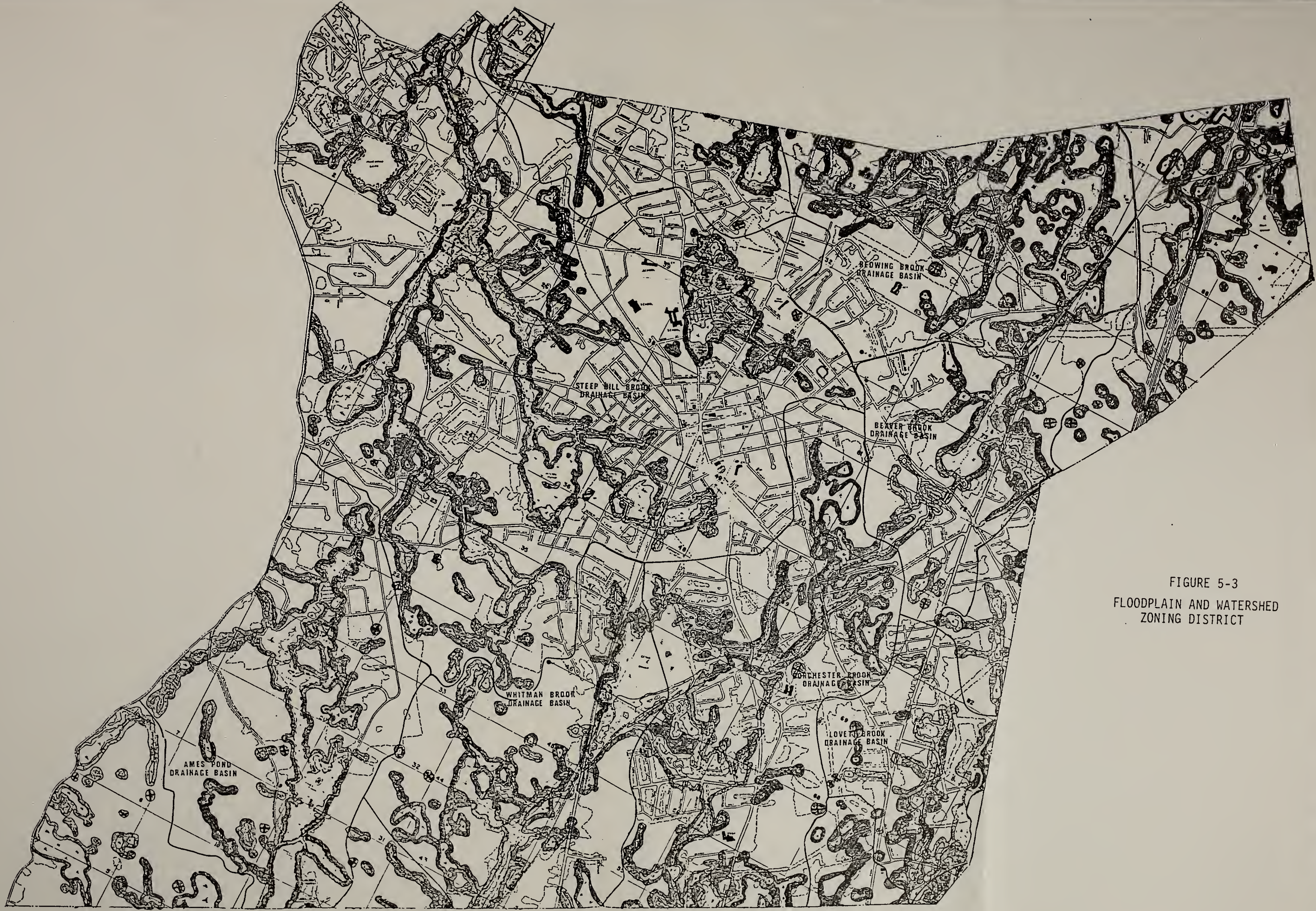
REDWING BROOK DRAINAGE BASIN
STEEP HILL BROOK DRAINAGE BASIN
BEAVER BROOK DRAINAGE BASIN
DORCHESTER BROOK DRAINAGE BASIN
WHITMAN BROOK DRAINAGE BASIN
LOVETT BROOK DRAINAGE BASIN
AMES POND DRAINAGE BASIN

FIGURE 5-3
FLOODPLAIN AND WATERSHED ZONING DISTRICT